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ABSTRACT

This report discusses the procedure used to provide information describing the present and projected interference between labor supply and demand as a part (Table I) of the Minnesota State Plan for Vocational-Technical Education. Chapter 1 briefly reviews previous and on-going research work which serves as a basis for the procedure. Chapters 2 and 3 detail steps in estimating labor market supply from vocational education at the secondary and postsecondary levels, including estimating (1) the number of high school graduates and number of them taking vocational education or the number of graduates from postsecondary vocational education programs, (2) the number of graduates -- obtaining employment, and (3) the number obtaining employment in specific occupations. Two tables (one of them lengthy) incorporating these data are presented as exhibits. Chapter 4 describes steps in projecting labor market demand: estimating total employment in specific occupations, estimating annual job openings in specific occupations, and listing total employment and annual job openings. The final chapter contains a series of recommended next steps to further improve the information for use in decision making about vocational education. Minnesota Secondary School Follow-up System and Minnesota Vocational Follow-up Student Questionnaires are appended. (YLB)

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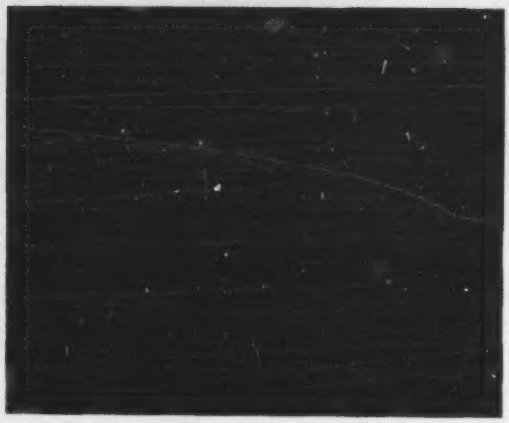
Vocational Education and Employment: Building a Basis for Planning in Minnesota

George H. Copa
M. Nagi Salem



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APRIL, 1980

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3. Disseminate research-related information to assist research and development efforts and to speed the implementation of worthy educational innovations.

4. Encourage and conduct training activities designed to increase the number and improve the competence of producers and consumers of vocational education research-related activities.

PREFACE

This report is the result of three years of research and development activities focused on improving information about the interface of vocational education and the labor market in Minnesota. The activities have been supported by the Division of Vocational-Technical Education in the Minnesota Department of Education. This effort is part of a larger program of research and development on improving the planning of vocational education in Minnesota which is being conducted by the Minnesota Research and Development Center for Vocational Education.

The authors acknowledge the advice, trust and patience of our Project Officer, Robert Bocklund during the course of our work. Special appreciation goes to Thomas Strom, Manager, Secondary Vocational Programs, Minnesota Department of Education; Paul Thomas, Minnesota Higher Education Coordinating Board; and John Cosgrove, Coordinator, Minnesota Occupational Information Coordinating Committee for critically reviewing and suggesting improvements in this report. The final contents, however, remain the responsibility of the authors.

George H. Copa

M. Nagi Salem

ABSTRACT

Information describing the present and projected interface between labor supply and demand is an important factor in planning vocational education. This report describes the procedure used to provide this information as a part of the Minnesota State Plan for Vocational-Technical Education. Previous and on-going research work which serves as a basis for the procedure is briefly reviewed. The procedure is presented as a series of steps used to derive estimates of the impact of secondary and full time, post secondary vocational education on labor supply in Minnesota. Minnesota Department of Economic Security publications are used as a basis for estimating labor force requirements in the State. The report concludes with a discussion of the present stage of development of the above information and a series of recommended next steps to further improve the information for use in decision making about vocational education.

TABLE OF CONTENTS

		Page
PREFACE		iii
ABSTRACT		v
CHAPTER I.	BACKGROUND AND PURPOSE	1
	Related Studies in Minnesota	1
	Purpose of Report	4
	Major Steps	5
	Assumptions and Limitations	5
CHAPTER II.	PROJECTED OUTPUT OF SECONDARY VOCATIONAL EDUCATION PROGRAMS	9
Step 1:	Estimating Number of High School Graduates in Future Years	9
Step 2:	Estimating Proportion of Graduates Who Were Enrolled in Vocational Education	10
Step 3:	Estimating Number of Graduates Who Will Enroll in Vocational Education	12
Step 4:	Estimating Proportion of Graduates Who Obtained Paid Employment	13
Step 5:	Estimating Number of Graduates Who Will Enter Paid Employment	13
Step 6:	Estimating Proportion of Graduates Who Enter Each Specific Occupation	14
Step 7:	Estimating Number of Graduates Who Will Enter Each Specific Occupation	19
Summary		19
CHAPTER III.	PROJECTED OUTPUT OF POST-SECONDARY VOCATIONAL EDUCATION PROGRAMS	23
Step 1:	Estimating Number of Graduates from Post-Secondary Vocational Education Programs	23
Step 2:	Estimating Number of Graduates Who Will Enter Paid Employment	31
Step 3:	Estimating Number of Graduates Who Will Enter Each Specific Occupation	32
Summary		67
CHAPTER IV.	PROJECTED EMPLOYMENT REQUIREMENTS	69
Step 1:	Estimating Total Employment in Specific Occupations	69
Step 2:	Estimating Annual Job Openings in Specific Occupations	69
Step 3:	Listing Total Employment and Annual Job Openings	71

Page

CHAPTER V. DISCUSSION AND RECOMMENDATIONS 81

Context 81
Recommendations 82
Summary. 87

REFERENCES 89

APPENDIX I: MINNESOTA SECONDARY SCHOOL FOLLOW-UP SYSTEM STUDENT QUESTIONNAIRE. 91

APPENDIX II: U.S. CENSUS OF POPULATION OCCUPATIONAL CLASSIFICATION SYSTEM 93

APPENDIX III: CROSS CLASSIFICATION OF U.S. CENSUS OF POPULATION AND MINNESOTA DEPARTMENT OF ECONOMIC SECURITY OCCUPATIONAL TITLES . . . 99

APPENDIX IV: MINNESOTA VOCATIONAL FOLLOW-UP STUDENT QUESTIONNAIRE 117

APPENDIX V: REPLACEMENT RATES FOR "OTHER" MAJOR OCCUPATIONAL GROUPS . . 121

Chapter I

BACKGROUND AND PURPOSE

Information describing the present and projected interface between labor supply and demand is an important factor in planning Vocational Education. Common sense would dictate that an educational program directed at preparing people for their work role should pay attention to the labor market in both planning and evaluation. This is confirmed by federal Vocational Education legislation which states that Vocational Education should be ". . . realistic in the light of actual or anticipated opportunities for gainful employment . . ." The Vocational Education Amendments of 1976 are even more specific in mandating the contents of five year and annual plans for Vocational Education which must ". . . assess the current and future needs for job skills within the state . . . through consideration of the latest available data on present and projected employment . . ." (United States 94th Congress, 1976). State Occupational Information Coordinating Committees were required to be established to assist in providing this planning information.

These legislative mandates have led to federal rules and regulations requiring the consideration of labor supply and demand information in Minnesota's State Plan for Vocational-Technical Education. The purpose of this report is to describe the information, as well as procedures applied to derive the information, used in the Minnesota State Plan for FY 1980. Further, the report provides an agenda for additional research and development activities needed to improve the procedures now being used.

Related Studies in Minnesota

This review goes back approximately ten years and specifically focuses on the research conducted by the Minnesota Research and Development Center for Vocational Education in its program of research in planning vocational education. An early focus of this work was to develop a model of vocational education to use in making planning decisions. This model, which has been revised many times, serves to identify important variables or factors in planning vocational education. The model has been tested through: (1) review by educational planners in Minnesota and other states (Copa, Geigle & Imade, 1976;

Copa & Geigle, 1976), (2) critical analysis of past ideas and efforts in planning vocational education (Copa, Imade & Geigle, 1976), (3) use in teaching about the planning of vocational education and information needed for such planning, and (4) most recently, reflections during a seminar on planning and vocational education in the United States involving nationally recognized experts in planning and in vocational education (Copa & Moss, 1978). The model still exists in unpublished form awaiting still another revision before being published (Copa, 1974). The model suggests that planning vocational education involves a dynamic matching on several characteristics of individuals seeking or having work roles and society, in general, needing work functions performed. The matching process is dynamic in that both individuals and society are continually changing their characteristics and wants relative to work. The several characteristics involved include numbers of individuals wanting work and work opportunities, individual abilities and work requirements, individual interests and work reinforcers, and geographic and timing considerations. Planning and, subsequently, evaluating of vocational education is then hypothesized to involve an interaction of information about individuals and the labor market. This particular report is concerned with the latter (i.e. information about the labor market and vocational education's relationship to the market).

As soon as it was evident that labor market information would be a major consideration in the planning model, efforts were devoted to developing labor market information in a format useful to planning vocational education. This effort resulted in the publication Average Annual Occupational Demand in Minnesota for the Period 1971-1980 (Copa & Irvin, 1974). In this publication, information from the Minnesota Department of Employment Services entitled Minnesota Employment Projections 1960-1980 (1974) was analyzed and converted to a format providing information about average annual demand, average annual growth or decline, average annual replacement, and average annual unfilled positions for about 100 occupational categories in Minnesota. As in the Minnesota Department of Employment Services publication, separate estimates were provided for Minnesota "in-total" and the Minneapolis-St. Paul Metropolitan Area. The development of this information by the Minnesota Research and Development Center for Vocational Education was discontinued with the publication of Minnesota Employment 1970-1980 in July, 1975, by the Minnesota Department of Employment Services. This new publication by the Employment

Service contained very similar information in a format similar to the previous MRDC publication. Since 1975, the Employment Services, now called the Minnesota Department of Economic Security, has published an even more detailed set of information on labor force requirements for Minnesota projected to 1985 (1978).

Also evident from the developing planning model was the notion that in order to relate vocational education's output, both planned and actual, to labor market information would require information about the occupation status of vocational education program leavers. At that time, a post-secondary follow-up system was in its initial development and implementation (Pucel, 1973). However, very little systematic information was available on secondary vocational program leavers. The MRDC initiated a program of research to develop and field test a procedure to develop information about the status of high school students after leaving school. From a pilot test involving eight schools and 2500 students in 1973 (Copa & Irvin, 1973) the procedures have been refined and in 1978 were used by 82 schools with 17,500 former high school students (Irvin & Forsberg, 1979). The Secondary School Follow-Up System together with the Vocational Follow-Up System (for post-secondary students) has resulted in an adequate data base to analyze and describe the effect of vocational education on the labor market in terms of basic facts such as occupations and industries selected, wages obtained, and geographic location of work.

The interaction of labor market demand and supply from vocational education evolved as the next issue in using the above information sources. In September of 1974, the MRDC published a report entitled Occupational Supply and Demand Information: A Format with Implications for Planning Education for Work (Copa & Irvin, 1974). This publication described a format or structure for "thinking about" the interaction of sources of supply and demand for labor. The format was "tried out" by using available information about supply and demand sources in Minnesota. The publication served to organize the information for matching and decision making purposes and to point out limitations of existing data systems. A suggested next step was to critically examine the flow of vocational education program leavers into the labor force in order to develop a way of characterizing the flow by program and examine its stability over time and differences between programs.

In 1977, the MRDC completed a study examining the "job selection patterns" of graduates from a sample of post-secondary vocational education

programs (Copa & Kleven). Results indicated that the post-secondary programs each have unique patterns of job selection by their graduates in terms of occupations (i.e., what they do) and industries (i.e., in what kind of business they do it). The stability of these patterns over years varied from one program to the next -- some being very consistent in job-selection patterns from year to year and others varying considerably.

Armed with the above knowledge about the relationship of vocational education and the labor market in Minnesota, the MRDC proposed the reexamination of procedures used to produce Table I, Employment Opportunities Related to Vocational Education required in the Minnesota State Plan for Vocational-Technical Education each year. The response of the State Department of Education was a request that the MRDC not only study the procedure to produce Table I, but also actually do the production. The MRDC accepted this responsibility and has produced the Table for the past three years (Minnesota State Department of Education, 1978, 1979, 1980). Each year, the procedures have been revised to better use available data, and the format of the Table has been altered to improve the ease of understanding and using the table.

Purpose of Report

The purpose of this report is to explain the contents of and the procedure used to produce Table I of the Minnesota State Plan for Vocational-Technical Education which relates the output of secondary and post-secondary vocational education programs to the labor force requirements of Minnesota's economy. It was decided to produce a report of this kind as a companion to the MRDC's third edition of Table I because of the number of requests for an explanation of this kind and because the procedures have begun to stabilize with smaller changes anticipated in future years.

The MRDC's involvement with the production of Table I has three basic purposes:

1. Produce Table I of the State Plan.
2. Conduct research and development activities to improve the accuracy and ease of interpreting Table I.
3. Document procedure used and apply it consistently in producing Table I.

This report provides a description of accomplishments given the above purposes.

Major Steps

The major questions attempted to be answered through the information contained in Table I are:

1. How many persons will graduate from secondary and post-secondary vocational education programs?
2. How many of the graduates will enter work?
3. What kinds of jobs will they select?
4. What jobs will be available?
5. Will there be more graduates than jobs?

The steps used to produce data for Table I corresponding to each of the above questions were as follows:

1. Estimate the number of vocational education graduates.
2. Estimate labor force participation rates for vocational education graduates.
3. Estimate labor supply from vocational education by occupation.
4. Estimate labor demand by occupation.
5. Display interface between labor supply from vocational education and labor demand.

Steps 1 through 3 were done separately for secondary and post-secondary vocational education programs. A visual representation of these steps is shown in Figure 1.

Assumptions and Limitations

In developing the procedure for deriving an estimate of the output of secondary and post-secondary vocational education programs and labor force requirements in Minnesota, it was assumed that the historical trend of changes in the past would continue at the same rate for the duration of projecting periods, or constant status would be maintained if there was evidence to indicate that a historic trend might not continue. A major limitation in the development of the procedure was that no new information was collected first hand. A second limitation was that labor supply from vocational education programs pertained only to programs conducted under the auspices of the Minnesota State Board for Vocational Education in secondary school and full time day programs in post-secondary area vocational-technical institutes;

the Table does not include adult vocational education programs or part-time post-secondary programs. Neither does it include job training programs in skill centers, hospitals, private proprietary schools or junior/community colleges since these are not under approval by the State Board for Vocational Education.

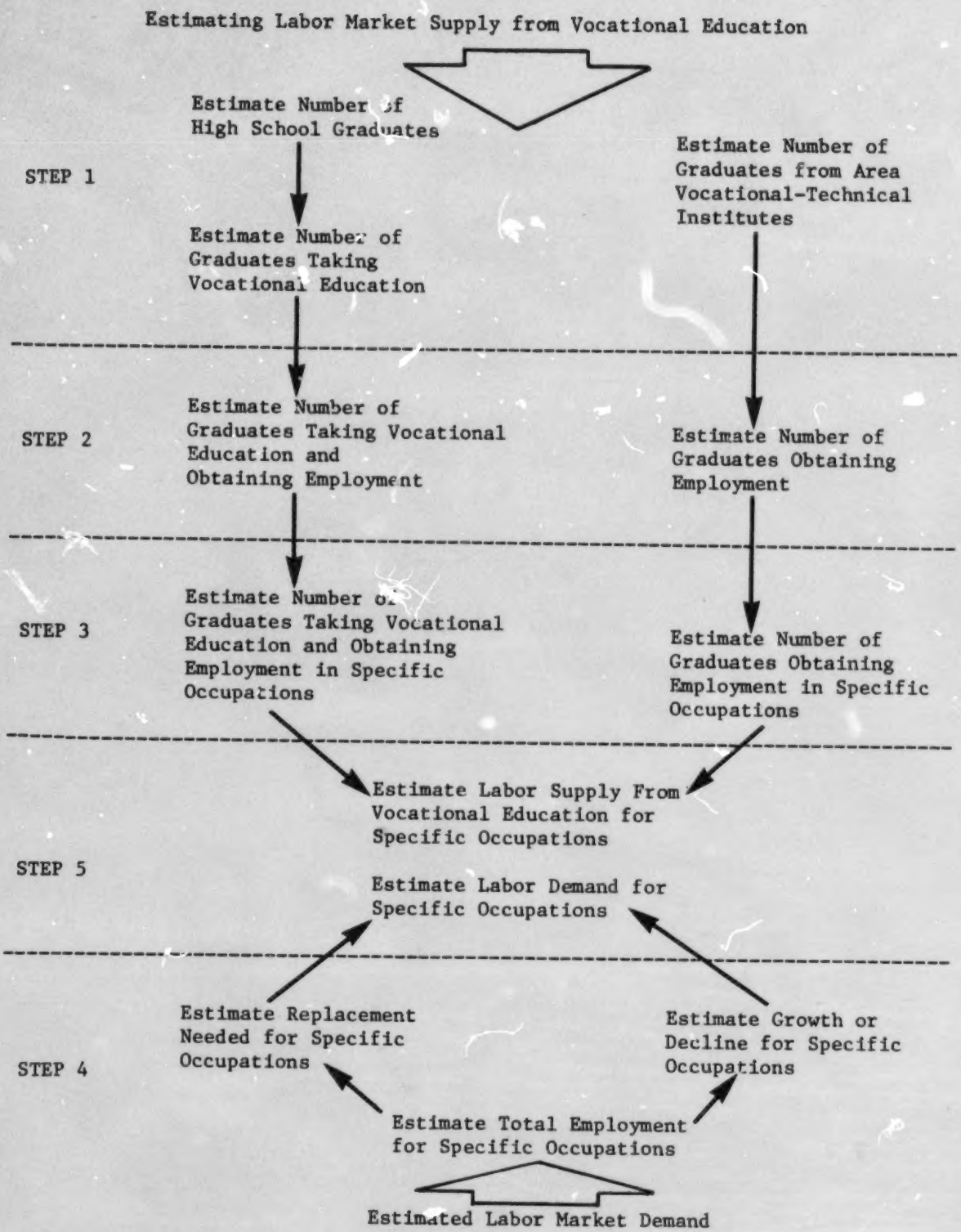
Estimating Labor Market Supply from Vocational Education
Estimate Number of High School Graduates
STEP 1
Estimate Number of Graduates Taking Vocational Education
Estimate Number of Graduates from Area Vocational-Technical Institutes
STEP 2
Estimate Number of Graduates Taking Vocational Education and Obtaining Employment
Estimate Number of Graduates Obtaining Employment
STEP 3
Estimate Number of Graduates Taking Vocational Education and Obtaining Employment in Specific Occupations
Estimate Number of Graduates Obtaining Employment in Specific Occupations
Estimate Labor Supply From Vocational Education for Specific Occupations
STEP 5
Estimate Labor Demand for Specific Occupations
Estimate Replacement Needed for Specific Occupations
Estimate Growth or Decline for Specific Occupations
STEP 4
Estimate Total Employment for Specific Occupations
Estimated Labor Market Demand

Figure 1. Major steps in producing Table I of the Minnesota State Plan for Vocational-Technical Education

Chapter II

PROJECTED OUTPUT OF SECONDARY VOCATIONAL EDUCATION PROGRAMS

Secondary vocational education programs in Minnesota have three major purposes: (1) in-depth exploration of occupations to assist in the career planning process, (2) development of occupational competencies designed to be recognized for advanced placement in post-secondary programs, and (3) development of occupational competencies necessary to enter an occupation (Minnesota Department of Education, 1977). Only the last of these is reflected in Table I of the Minnesota State Plan for Vocational-Technical Education. Because of these broad purposes, it would not be useful to sub-categorize secondary vocational education in more detail than the six major areas of agriculture, business and office, distributive, health, home economics, trade and industrial. Even using these categories, students cannot be categorized into mutually exclusive vocational program because many students take courses in more than one of the above major program categories which is a desired phenomenon given the above purposes. Further, students have the opportunity to be considered vocational education program graduates after completing as little as one quarter (approximately 6 weeks), attending one hour per day, for a total of 30 hours of vocational education. This minimum stands in contrast to an upward range of more than 1000 hours of instruction obtained by some students at the secondary school level.

With the above context, it becomes very difficult to validly derive and display the output of secondary vocational education programs as it impacts on the labor market in Minnesota. Even more difficult is the interpretation of the resulting numbers. The process used in deriving the data for Table I of the FY 1980 State Plan for Vocational-Technical Education is next presented in some detail as a series of steps.

Step 1: Estimating Number of High School Graduates in Future Years

The Minnesota State Department of Education has prepared an account of past and projection of future 12 grade enrollments for Minnesota's public secondary schools (Minnesota State Department of Education, 1978). These estimates were used as the base numbers for making estimates of vocational education graduates in future years. The 12th grade enrollment numbers for

the school years 1976-77 through 1982-83 are shown in Table 1. It was assumed that the number of graduates was equal to the number enrolled; this assumption was made because the concern in this process was with all those leaving school from that grade. The term "graduate" is being used to include all high school leavers who should have completed high school during a given year.

Table 1
Number of Public 12th Grade Enrollments in
Minnesota, 1976-77 to 1982-83

Year	Number of 12th graders
1976-77	74,013
1977-78	73,950
1978-79	73,177
1979-80	72,464
1980-81	69,783
1981-82	65,697
1982-83	60,950

Step 2: Estimating Proportion of Graduates Who Were Enrolled in Vocational Education

The next element of information needed was the percent of high school graduates who were enrolled in vocational education courses sometime during their high-school program. The source of this information was the Minnesota Secondary School Follow-Up System; data on graduates of four years from 1973-74 to 1976-77 were utilized. For the past five years this system has been coordinating the follow-up of high school students (both graduates and drop-outs) one year after graduation by a volunteer set of high schools in Minnesota. The follow-up conducted during the Spring of 1978 involved 82 schools and about 17,500 students from the Class of 1977. Comparing the number of students involved to the number of graduates for school year 1976-77 in Table 1 shows that about 24 percent of the total number enrolled in the state were followed-up.

A copy of the follow-up questionnaire is shown in Appendix I. As

indicated on the questionnaire, the system provided information on high school courses taken in grades 10, 11, and 12 for each student followed-up. A vocational education course was defined by the system as one in which the school is receiving State vocational education funding reimbursement (Irvin, Russo & Galey, 1978).

Because a volunteer set of schools was involved which were not necessarily a random sample, a series of calculations was used to make the estimates as representative as possible. Based on previous unpublished analysis, it was found that school size and geographic location were two of the most important factors in accounting for variation between high schools in the proportion of students taking vocational education and the proportion of these students who were employed a year after graduation. Using this basis, high schools participating in the Follow-Up System were first partitioned by size (i.e., greater than 225 graduates and 225 or less) and geographic location (i.e., high school located in Economic Region 11--seven county, Minneapolis-St. Paul, Metropolitan Area--and other Economic Regions). Separate proportions for graduates who had enrolled in vocational education courses were derived for each combination of size and geographic location categories. In turn, all high schools in Minnesota were categorized into these same school size and geographic location categories. Following, the multiplying of respective proportions times total number of graduates for each size and location category and then summing across all categories resulted in a best estimate of proportion of high school graduates who had taken a vocational education course during high school.

The proportions indicated above have been calculated for each year that the MRDC has been producing Table I of the State Plan. Therefore, estimated proportions were also available for school years 1973-74 to 1976-77. Rather than rely on a single year's data, and making the assumptions that "things will remain the same", the proportions for the four years were averaged to provide a base to make estimates into the future. The percentages derived in this process are shown in Table 2 for each vocational education program. The Table indicates, for example, that about 11.3 percent of high school graduates were estimated to have taken a vocational agriculture course during high school. The sum of percentages across all vocational programs is greater than the total percent of graduates who had taken a vocational education course. The reason for this, as stated perviously, is that many students take courses in more than one vocational education program during

high school and therefore, result in multiple counting when summing across vocational programs.

Table 2

Percent of High School Graduates Taking Vocational Education in High School

Program	Percent of total graduates
Agriculture	11.3
Distributive	7.1
Home economics	34.8
Health	4.0
Business and office	19.4
Trade and industrial	23.3

Note. These percentages were derived from data originally taken from the Minnesota Secondary School Follow-Up System for school years 1973-74 through 1976-77.

Step 3: Estimating Number of Graduates Who Will Enroll in Vocational Education

Using the information presented in Table 1, estimates of future number of high school graduates, and Table 2, estimated proportion of graduates who were enrolled in vocational education courses in high school in the recent past, estimates of future number of graduates who will enroll in vocational education were calculated. First, the assumption was made that the proportion of future graduates who will take a vocational education course will remain the same as the average proportion who had taken such a course during high school in the last four years. By multiplying the percentages shown in Table 2 times the graduation estimates shown in Table 1, the desired estimate of number of graduates who will take a vocational education course was calculated. The estimates for 1978-79, 1979-80, and 1981-82 are shown in Table 3.

Table 3

Estimated Number of Graduates Who Will Take Vocational Education Courses

Program	Number of graduates		
	1978-79	1979-80	1981-82
Agriculture	8,410	8,330	7,550
Distributive	5,290	5,240	4,750
Home economics	25,840	25,500	23,200
Health	2,950	2,920	2,650
Business and office	14,470	14,330	12,990
Trade and industrial	17,340	17,170	15,570

Step 4: Estimating Proportion of Graduates Who Obtained Paid Employment

Again using the data available through the Minnesota Secondary School Follow-Up System, estimates of the proportion of graduates who had taken a vocational education course during high school and who were employed at paid work a year later were made. Item #3 of the follow-up questionnaire shown in Appendix I gathers data on "present" (i.e., about one year after graduation) activity; one of these activities is "paid employment". Using the summary data from this question and following the same procedure as was described in Step 2 concerning the proportion of graduates who had enrolled in vocational education courses, estimates were made of the proportion of these graduates who had obtained paid employment. As derived, the estimates again represent four year averages for all Minnesota high school graduates. The estimates are shown in Table 4.

Step 5: Estimating Number of Graduates Who Will Enter Paid Employment

Assuming that the percentages shown in Table 4 will remain the same in future years, they were multipled times the estimated number of graduates

who will take vocational education in the future as shown in Table 3 to obtain the desired estimates of number of graduates who will enter paid employment. These numbers as shown in Table 5 represent the best estimate of actual supply from secondary school vocational education programs to the labor market in Minnesota during each of three years.

Table 4

Percent of Graduates Who Obtained Paid Employment

Program	Percent
Agriculture	67.7
Distributive	69.8
Home economics	63.4
Health	58.0
Business and office	63.3
Trade and industrial	66.6

Note. These percentages were derived from data originally taken from the Minnesota Secondary School Follow-Up System for the school year 1973-74 to 1976-77.

Step 6: Estimating Proportion of Graduates Who Enter Each Specific Occupation

At this step, more of the complexity of reality begins to take focus and the procedures are not as straight forward as in previous steps. As mentioned previously, high school students often take courses in more than one vocational education program. The implication of this fact is that it is not meaningful to derive separately for each vocational education program the estimates of the proportion of graduates who enter each occupation with the intent of summing across program; the result of this process would be a large over-estimate of the impact on the labor market for each occupation of graduates who had taken vocational education courses. The over estimate would be caused by multiple counting because graduates were enrolled

Table 5

Estimated Number of Graduates Who Will Enter Paid Employment

Program	Number of graduates entering paid employment		
	1978-79	1979-80	1981-82
Agriculture	5,690	5,640	5,110
Distributive	3,700	3,660	3,320
Home economics	16,390	16,230	14,710
Health	1,710	1,700	1,540
Business and office	9,160	9,070	8,220
Trade and industrial	11,550	11,440	10,370

in courses in more than one program.

Additional analysis of the multiple enrollments in vocational education programs shows that there is no small number of unique categories of vocational education program combinations (e.g., agriculture and distributive, home economics and business and office); rather a wide variety of combinations exist with no perceived definite patterns. Further, because of the multiple program enrollment and the nature of occupations available to high school graduates, there do not seem to be major differences in occupations entered when comparing graduates who enrolled in courses in one program versus another.

Another complexity of realty is that it is reasonable to expect both of the relationships of vocational education programs to specific occupations which are shown in Figure 1. In the upper relationship, graduates who were enrolled in a given vocational program entered a variety of different occupations. For example, those enrolled in vocational agriculture could be using their education in farming, mechanic in farm equipment dealership, salesclerk in hardware store, operative in milk processing plant or butcher in food store. In the lower relationship shown in Figure 1, graduates from several different vocational education programs might use their education in the same occupation. For example, those who enter the occupation of salesclerk in a typical small hardware store could benefit from education received

in any of the following vocational education programs: agriculture, distributive, business and office, home economics, and trade and industrial.

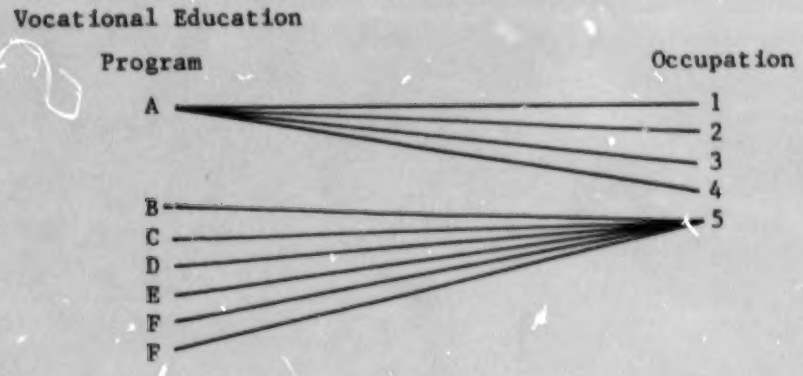

Figure 2. Relationship of vocational education program to specific occupations

With this description of reality, it was decided to treat all graduates who had taken vocational education courses and entered employment as one group without sub-dividing by vocational program. Referring to Item #4.2 on the follow-up questionnaire in Appendix I, data were gathered about the occupation in which former high school students were employed approximately one year after graduation. In the Minnesota Secondary School Follow-Up System this occupational information is categorized using the classification and coding system developed by the U.S. Bureau of Census (1971) (See Appendix II).

The Minnesota Secondary School Follow-Up System provided the data on occupations selected by graduates of school years 1973-74 through 1976-77. The rates of occupation selection were calculated as the number of graduates in a given year who selected a specific occupation divided by total number of graduates who took a vocational education course and reported their employment for the same year. An average of the rate of selection of specific occupations for four years was calculated.

For use in preparing Table I of the State Plan, the 450 Census categories were converted to about 200 occupational categories used by the Minnesota Department of Economic Security. This cross classification is shown in Appendix III. In reviewing the summary follow-up data on occupations entered, it was evident that relatively few of the 200 occupations account for a large share of the high school graduates. Because of this feature, the decision was to show in Table I only those occupations selected by at least one-half of one

percent of graduates; there were 43 occupations which met this cut-off point. These occupations account for 75.7 percent of the total high school graduates who had taken vocational education and had entered paid employment.

The proportion of graduates selecting each of the 43 specific occupations is shown in percentage form in Table 6. The "Other" category at the end of the Table includes the proportion of graduates not included in the specific occupation categories listed previously in the Table.

Table 6

Percent of Graduates Who Entered Selected Occupations

Occupations	Percent of graduates who entered
Managers & administrators	
Restaurant, cafe, bar manager	0.7
Sales manager	0.7
Other managers, officials, proprietors	0.6
Sales workers	
Other sales workers	7.6
Clerical workers	
Bank tellers	0.9
Bookkeering, billing machine operators	1.3
Cashiers	4.3
Counter clerks, except food	0.9
File clerks	1.2
Keypunch operators	0.5
Receptionists	2.0
Shipping, receiving clerks	0.6
Secretaries, general	4.5
Stock clerks, storekeepers	1.8
Typists	2.0
Other clerical workers	4.0

Table 6 (Continued)

Percent of Graduates Who Entered Selected Occupations

Occupations	Percent of graduates who entered
Craft workers	
Carpenters	0.8
Machinists	0.7
Auto mechanics	0.9
Other craft workers	0.6
Operatives workers	
Assemblers	3.0
Garage workers, gas station attendants	1.5
Welders and flamecutters	0.7
Misc. machine operatives	1.9
Bus drivers	0.7
Delivery and route workers	0.6
Truck drivers	1.2
Laborers	
Constr. labor, except carpenter	1.0
Gardeners, groundskeepers, exc. farm	0.6
Stock handlers	1.1
Warehouse laborers, n.e.c.	0.6
Other laborers	6.2
Farmers and farm workers	
Farmers (owners and tenants)	0.7
Farm laborers, wage workers	1.7
Service workers	
Lodging, quarters cleaners	0.6
Janitors and sextons	1.9
Cooks, except private	2.6
Dishwashers	0.5

Table 6 (Continued)

Percent of Graduates Who Entered Selected Occupations

Occupations	Percent of graduates who entered
Food counter, fountain workers	1.4
Waiters	4.8
Nurses aides, orderlies	3.8
Other service workers	1.9
Others	
Others	24.3

Step 7: Estimating Number of Graduates Who Will Enter Each Specific Occupation

Again, assumming that high school graduates will continue to do as they have been doing and enter the same occupations in the same proportions as in the past, estimates were made of the number of graduates who will enter each specific occupation in future years. These estimates were derived by multiplying the proportions shown in Table 6 times the estimated total number of graduates who will take vocational education and enter employment; this number is 28,660, 28,382, and 26,064 for 1978-79, 1979-80, and 1981-82, respectively. The resulting estimates are shown in the column headed, "Enter Occupation", in Exhibit 1. This step culminates the procedure used to derive an estimate of the impact of secondary vocational education programs on the labor market for specific occupations in future years in Minnesota.

Summary

The steps described above result in a portion of Table I of the Minnesota State Plan for Vocational-Technical Education. This portion of Table I is shown as Exhibit 1. The source of data in each column is as follows:

Exhibit 1

Section of Table I in State Plan for Vocational-Technical Education Relating to Secondary Vocational Education Programs in Minnesota, July 1, 1979-June 30, 1980

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Secondary Programs

[NOTE: SECONDARY VOCATIONAL GRADUATES COULD HAVE ENROLLED IN MORE THAN ONE VOCATIONAL EDUCATION PROGRAM, THUS DOUBLE COUNT OF GRADUATES MAY HAVE OCCURRED. ALSO, THE OCCUPATIONS SELECTED AS REPORTED IS BASED ON ALL SECONDARY VOCATIONAL GRADUATES FROM THE SIX PROGRAM AREAS.]

O.E. Code1	Vocational Educational Program	Graduates			Enter Employment		
		1979	1980	1982	1979	1980	1982
01. 0000	Agriculture	8410	8330	7550	5690	5640	5110
04. 0000	Distributive	5290	5240	4750	3700	3660	3320
07 0000	Health	2950	2920	2650	1710	1700	1540

Most Frequent Occupations Selected	Enter Occupation			Annual Job Openings	Total Employment 1979
	1979	1980	1982		
MANAGERS & ADMINISTRATORS					
Restaurant, Cafe, Bar Mgrs.	188	186	169	380	9951
Sales Manager	204	202	183	690	15019
Other Managers, Officials	168	167	151	5605	116705
SALES WORKERS					
Other Sales Workers	2186	2164	1962	4040	91275
CLERICAL WORKERS					
Bank Tellers	260	257	233	570	6431
Bookkeeping, Billing Oper.	373	370	335	95	1709
Cashiers	1228	1216	1102	1715	21336
Counter Clerks, exc. Food	267	265	240	675	8274
File Clerks	335	332	301	385	4581
Keypunch Operators	155	154	139	150	4337
Receptionists	565	559	507	1170	12709
Shipping, Receiving Clerks	166	164	149	425	9477
Secretaries, General	1303	1291	1170	6395	63152
Stock Clerks, Storekeepers	522	517	469	375	9901
Typists	544	539	488	1830	20211
Other Clerical Workers	1156	1145	1038	4430	53030
CRAFTS WORKERS					
Carpenters	236	234	212	670	21809
Machinists	215	213	193	235	8332
Auto Mechanics	254	252	228	580	19305
Other Craft Workers	174	172	156	1475	30830

Exhibit 1 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Secondary Programs

NOTE: SECONDARY VOCATIONAL GRADUATES COULD HAVE ENROLLED IN MORE THAN ONE VOCATIONAL EDUCATION PROGRAM, THUS DOUBLE COUNT OF GRADUATES MAY HAVE OCCURRED. ALSO, THE OCCUPATIONS SELECTED AS REPORTED IS BASED ON ALL SECONDARY VOCATIONAL GRADUATES FROM THE SIX PROGRAM AREAS.

O.E. Code	Vocational Educational Program	Graduates			Enter Employment		
		1979	1980	1982	1979	1980	1982
09. 0000	Home Economics	25840	25590	23200	16390	16230	14720
14. 0000	Business and Office	14470	14330	12990	9160	9070	8220
17. 0000	Trade and Industrial	17340	17170	15570	11550	11440	10370

Most Frequent Occupations Selected	Enter Occupation			Annual Job Openings	Total Employment 1979
	1979	1980	1982		
OPERATIVES WORKERS					
Assemblers	856	848	768	2275	31716
Garage Workers, Gas Station Att.	444	439	398	45	12433
Welders and Flamecutters	205	203	184	570	13023
Misc. Machine Oper.	534	528	480	975	24899
Bus Drivers	207	205	186	275	6836
Delivery and Route Workers	160	159	144	380	15523
Truck Drivers	356	353	320	800	30835
LABORERS					
Constr. Laborers, exc. Carp.	301	298	271	1[illegible]5	13443
Gardeners, Groundskeeper	175	177	160	350	5989
Stock Handlers	308	305	276	655	20241
Warehouse Laborers	172	171	155	45	3736
Other Laborers	1783	1765	1600	635	14210
FARMERS AND FARM WORKERS					
Farmers (Owners and Tenants)	191	189	171	1775	71491
Farm Laborers, Wage Workers	493	488	443	275	15997
SERVICE WORKERS					
Lodging, Quarters Cleaners	163	162	146	480	5377
Janitors and Sextons	560	554	503	1550	31409
Cooks, exc. Private	739	731	663	1690	23947
Dishwashers	149	147	134	280	6376
Food Counter, Fountain Workers	390	386	35[illegible]	390	4807
Waiters	1380	1367	12[illegible]9	2785	35572
Nurses Aides, Orderlies	1091	1080	[illegible]79	2895	29938
Other Service Workers	548	543	492	817	21205
OTHERS					
Others	6952	6885	6240		

Column heading	Source
OE code	U.S. Office of Education code assigned to vocational education program
Vocational Education Program	Title of program assigned using U.S. Office of Education coding structure
Graduates	Table 3 in this chapter
Entered Employment	Table 5 in this chapter
Most Frequent Occupations Selected	Table 6 in this chapter
Enter Occupations	From Step 7 in this chapter

Chapter III

PROJECTED OUTPUT OF POST-SECONDARY VOCATIONAL EDUCATION PROGRAMS

The Minnesota Vocational Follow-Up System provided the major source of data for projecting output of post-secondary vocational educational programs. The follow-up system was initially developed and operated by the Division of Industrial Education, University of Minnesota (Pucel, 1973) and later by National Computer System, Minneapolis, Minnesota. Now the System is operated by Educational Management Services also located in Minneapolis, Minnesota. The system has essentially remained the same in terms of procedures and basic purpose of data collection instruments since its initiation.

The Minnesota Vocational Follow-Up System utilizes four data collection instruments. One is to collect biographical information about the enrollee in order to generate annual enrollment reports for each program in each institute and across the state. Second is a termination form used to report when students leave the program, their status on leaving, and reasons for termination (e.g., graduated, economic hardship, completion of training objectives, unsatisfactory progress). The last two instruments are follow-up questionnaires, one sent to the students, and the other to their employers; these are used to provide follow-up reports for each program within each institute and also across the state. Former students of full-time, day programs who have graduated or completed their training objectives from Minnesota Area Vocational-Technical Institutes (AVTI) are contacted one year after graduation with the mailed follow-up questionnaire. A copy of relevant sections of the questionnaire is shown in Appendix III. Following are the detailed steps in using the summary data from this questionnaire to estimate the impact of post-secondary vocational education programs on the labor market in Minnesota.

Step 1: Estimating Number of Graduates from Post-Secondary Vocational Education Programs

The State Department of Education, Division of Vocational-Technical Education provided an actual count of the graduates of full time, day programs in the previous two years (i.e., 1976-77, 1977-78) and projected count of

graduates for 1978-79 for each vocational education program. This information was an accumulation of data submitted to the Department of Education by the 33 AVTI's. Vocational education programs were categorized into about 135 program areas. In addition, enrollee and termination reports from the Minnesota Vocational Follow-Up System were used to supplement the accuracy of post-secondary program graduates. The term graduate is used here to refer to both those who actually completed a program and formally graduated as well as those who completed their own training objectives in the program, although may not have formally graduated by completing all of the program being offered. Summary information for each program is provided in Table 7.

The procedure used to derive estimates of the number of post-secondary area vocational-technical institute graduates for school years 1978-79, 1979-80 and 1981-82 includes:

1. Accumulate number of graduates for the past three years by program (see Table 7).
2. Calculate average annual change in graduates for each program.
3. Estimate number of completions for each program for future years (i.e., 1978-79, 1979-80, and 1981-82) by linear extrapolation (see Exhibit 2). For those newer programs with only one year of data available, it was assumed that the number of graduates would stay the same in future years. If two years of data were available, it was assumed that the number of graduates in future years would be equal to the average of the two years.

Changes in the U.S. Office of Education codes assigned to vocational education programs in the State necessitated discarding the use of Follow-Up System termination reports in estimating the number of graduates from post-secondary programs in preparing the Minnesota State Plan for FY 1980. As historic data is again developed with the new coding system, termination reports can again be used to supplement the projected count of graduates provided by the State Department of Education reports. Also, when enrollment data begin to accumulate under the new coding system, enrollment report data from the Follow-Up System can also be used in conjunction with termination data to project future number of graduates. This approach was used in preparation of Table I for the State Plan for FY 1979. It was assumed that enrollment in a specific program could be divided into two portions, those that are 19 years old and younger and those older than 19 years. The first group's enrollment trend was assumed to follow the trend for number of high school graduates. Projecting

Table 7

Number of Graudates from Post-Secondary
Vocational Education Program

OE code	Program	Number of graduates		
		1976-77	1977-78	1978-79
010100	Agricultural production	220	220	228
010101	Livestock	27	30	52
010104	Farm management	33	48	42
010200	Agricultural supplies & services	149	159	167
010299	Farrier	21	12	14
010300	Farm equipment mechanic	143	142	150
010301	Water & well drilling	3	8	8
010302	Farm buildings and conviences	27	26	24
010500	Horticulture aide	50	58	62
010501	Specialty crop production	10	7	23
010502	Floral production	28	16	20
010504	Landscape technology	215	183	184
010600	Natural resources technology	35	52	52
010603	Land construction technology	15	13	15
010703	Forest harvesting technology	18	35	40
040100	Advertising	52	72	169
040101	Newspaper skills	--	15	14
040200	Fashion merchandising	195	229	192
040400	Finance and credit management	35	45	50
040500	Floral sales	54	38	48
040600	Supermarket management	88	80	69
040800	Sales marketing & management	506	514	622
040801	Small business management	16	20	18
040900	Hardware-building marketing mgmt.	31	45	39
041000	Interior design	113	116	120
041100	Hotel and motel supervision	--	13	14
041200	Professional sales	23	25	23
041201	Vending repair and Merchandising	27	28	36

Table 7 (continued)

Number of Graudates from Post-Secondary
Vocational Education Program

OE code	Program	Number of graduates		
		1976-77	1977-78	1978-79
041203	Industrial and institutional buyer	--	--	12
041300	Insurance sales	5	8	12
041400	International trade specialist	20	22	32
041600	Service station occupation	3	6	11
041700	Real estate sales	19	13	16
041800	Arena management	6	15	21
041801	Recreation, sporting goods mgmt.	23	44	44
041802	Travel planner	42	35	66
041900	Distribution, transport, mgmt.	37	37	39
070101	Dental assistant	272	267	299
070103	Dental lab technician	46	40	40
070203	Medical lab assistant	147	154	152
070205	Ward clerk	137	158	167
070302	Licenced practical nurse	1171	1042	1104
070303	Nurse aide	1122	1477	1095
070304	Human service assistant	104	115	111
070305	Surgical technician	87	97	130
070307	Home health aide	--	--	--
070401	Occupational therapy assistant	50	52	58
070403	Orthotics and prosthetis technician	13	16	15
070603	Optometric assistant	29	42	64
070900	Bio-medical equipment technician	27	16	26
070901	Electroencephalograph technician	--	10	10
070903	Inhalation therapist	26	67	68
070904	Medical assistant	127	72	75
070905	Central service technician	32	25	20
070907	Paramedic	22	25	26
070911	Pharmacy technician	--	--	15

Table 7 (continued)

Number of Graudates from Post-Secondary
Vocational Education Program

OE code	Program	Number of graduates		
		1976-77	1977-78	1978-79
070912	Chemical dependency specialist	--	--	10
090101	Consumer home making	--	--	10
090201	Child care assistant	172	175	169
090202	Apparel specialist	77	85	69
090203	Food service managers	58	58	64
090206	Fashion, fabrics & notions	19	28	25
090207	Dietetic assistant	29	30	41
090211	Delicatessen and catering	11	18	18
090212	Educational development preparation	--	45	80
140100	Accounting	759	852	890
140102	Bookkeeping	42	47	67
140105	Bank clerk	122	152	164
140199	Practical business management	33	83	94
140201	Electronic data processing	112	82	115
140202	Data entry	110	139	152
140203	Data processing II	183	275	325
140305	Business and office clerk	1178	1097	1053
140308	Medical clerical	12	17	12
140309	Ward clerk	132	120	85
140406	Receptionist	48	48	48
140499	Medical record technician	18	18	24
140503	Purchasing and inventory clerk	10	20	11
140505	Traffic office clerk	27	36	33
140601	Educational aide	50	38	53
140701	Administrative secretary	18	19	15
140703	Stenographic clerical	78	89	106
140704	Court reporter	19	23	25
140705	General secretary	782	872	809

Table 7 (continued)

Number of Graudates from Post-Secondary
Vocational Education Program

OE code	Program	Number of graduates		
		1976-77	1977-78	1978-79
040706	Educational secretary	2	--	--
140707	Legal secretary	276	306	298
140708	Hospital station secretary	59	63	63
140709	Medical secretary	348	336	326
140801	Agricultural banking	27	33	36
140805	General office	48	--	--
140901	Typist	66	27	20
160101	Air traffic control	17	30	30
160103	Architectural drafting	115	109	111
160105	Chemical technology	36	35	38
160106	Civil highway technology	104	123	126
160107	Cable TV technician	34	29	29
160108	Electronic technology	500	592	479
160109	Electro-mechanical technology	81	79	79
160110	Environmental technology	39	43	52
160111	Industrial energy systems	25	44	53
160112	Instrumentation technician	33	30	28
160113	Quality control technician	6	9	63
160114	Industrial technology	83	62	68
160118	Tool engineering and design	15	8	15
160203	Food lab and management	15	34	18
160300	Electro-medical technician	10	10	10
160701	Avionics-aviation electronics	25	26	21
160703	Electronic communication technician	20	18	17
160704	Communication technology	71	81	82
160705	Fluid power technician	233	111	139
160706	Powder metal technology	22	16	22
170100	Air conditioning, refrigeration	199	142	156

Table 7 (continued)

Number of Graudates from Post-Secondary
Vocational Education Program

OE code	Program	Number of graduates		
		1976-77	1977-78	1978-79
170200	Appliance repair	46	64	60
170300	Used car renovator	12	10	10
170301	Auto body	398	395	391
170302	Auto mechanics	1033	1000	1033
170303	Fork lift operator	3	13	10
170399	Parts person training	186	226	195
170401	Aircraft mechanics	104	115	129
170600	Office machine service	36	40	36
170700	Commercial art	16[illegible]	135	153
170704	Lettering and design	27	20	20
170900	Commercial photography	56	47	47
170901	Photographic technology	49	39	44
171000	Construction	95	114	123
171001	Carpentry	344	361	433
171002	Electrical technology	261	294	321
171003	Diesel and truck mechanics	84	57	70
171004	Bricklaying	42	41	36
171005	Painting and decorating	62	57	59
171007	Plumbing	119	100	110
171001	Maintenance mechanic	137	134	140
171012	Heavy equipment operation	71	89	113
171014	Mobile home repair	18	31	29
171100	Custodial and building maintenance	22	43	56
171200	Diesel and truck mechanic	345	341	344
171201	Truck driving	288	302	311
171301	Architectural drafting	164	127	132
171302	Mechanical drafting	197	246	260
171303	Technical drafting	10	15	1[illegible]
171304	Construction drafting	35	49	42

Table 7 (continued)

Number of Graudates from Post-Secondary
Vocational Education Program

OE code	Program	Number of graduates		
		1976-77	1977-78	1978-79
171402	Electrical line person	54	52	54
171403	Electric motor winding & repair	13	17	18
171501	Telephone communication technician	72	79	78
171502	Audio visual technology	63	49	61
171503	Radio and television repair	50	58	53
171900	Graphic arts	398	342	407
171902	Printing - offset	19	36	53
172101	Optical technology	60	57	57
172102	Watch making	18	18	18
172302	Machine shop trades	417	345	390
172303	Production machinist	86	74	90
172305	Sheet metal design	60	65	62
172306	Welding	662	705	701
172307	Tool and die machinist	190	228	215
172309	Pattern maker	7	10	10
172399	Jewelry repair	15	13	13
172601	Barbering	11	10	10
172602	Cosmotology	376	372	385
172700	Plastic injection, mold making	33	27	26
172802	Law enforcement	79	86	103
172901	Baking	49	40	37
172902	Food preparation cooking	497	612	608
172903	Meat cutting	177	155	153
172904	Waiter/waitress	5	6	5
172999	Kitchen assistant	31	35	38
173100	Small engine repair	239	268	266
173200	Total energy	11	15	10
173302	Tailoring	42	33	30

Table 7 (continued)

Number of Graudates from Post-Secondary
Vocational Education Program

OE code	Program	Number of graduates		
		1976-77	1977-78	1978-79
173402	Shoe repair	14	8	8
173500	Upholstery	24	28	28
173601	Cabinet making	90	95	111
173699	Wood finishing	28	15	15
174001	Musical string instrument	12	18	17
174002	Band instrument repair	17	18	18
174003	Electronic musical instrument	15	15	18

Note. Minnesota State Department of Education, Division of Vocational Technical Education. Data for 1976-77 and 1977-78 are actual count at end of year. Data for 1978-79 are estimates made in October, 1978.

enrollment for the second group was based on linear extrapolation of past trends for that age group in each program. Addition of projections of enrollment for the two groups provided an estimate of enrollment in each post-secondary program in future years. Finally, application of termination rates from the Follow-Up System "termination report" to enrollment projection provided an estimate of number of post-secondary graduates from AVTI's.

Step 2: Estimating Number of Graduates Who Will Enter Paid Employment

An estimate of the proportion of graudates who will enter paid employment was necessary since all graduates do not enter the labor market or, at least, not in equal proportions for all programs. These estimates were based on data from the Vocational Follow-Up System for graduates for only the school year 1976-77. Again, as historic data begin to accumulate with the revised program

coding system, an average rate of employment could be derived to provide more stable estimates. For the FY 1980 State Plan, rates for each program were calculated by dividing the number of graduates who were employed one year after graduation by the number of graduates for which follow-up information was available. It was assumed that the employment rate for non-respondants to the follow-up questionnaire is the same as for those who responded.

Step 3: Estimating Number of Graduates Who Will Enter Each Specific Occupation

Job selection patterns describe the interface of vocational education program and the labor market in terms of the jobs selected by program leavers (Copa & Kleven, 1977). Follow-up questionnaires from the Minnesota Vocational Follow-Up System provided the source of data for constructing job selection patterns for each post-secondary vocational education program reported in Table I of the State Plan. The occupational title and duties of the job held by graduates who returned completed follow-up questionnaires was available on the original questionnaire; see Section IV of the follow-up questionnaire shown in Appendix IV. This information was available for first job held after graduation and current job, if the graduate changed their job. In order to obtain the necessary data for use in preparing Table I of the State Plan, occupational titles were coded from the original questionnaire using the occupational classification system used by the U.S. Bureau of the Census (1971); 439 occupational categories are used in this system.

In order to facilitate the interface between labor supply from graduates of post-secondary AVTI programs and labor market demand, the occupational codes for jobs selected by graduates were converted to occupational codes developed for occupations used by the Minnesota Department of Economic Security. This process resulted in converting the 439 occupational code categories used by the Bureau of Census to 188 codes used by Minnesota Department of Economic Security; the cross classification is shown in Appendix IV.

A table showing the number of graduates who entered each specific occupation was prepared for each of the post-secondary programs. A sample job selection pattern is shown in Table 8 for the Carpentry program. Upon visual examination of these tables, it was observed that in most programs, three occupations represented the jobs selected by about 60 percent of the program graduates.

Hence, a decision was made to report only a maximum of three occupations for each program in Table I of the State Plan. All other occupations selected by a program's graduates, after accounting for the three most frequent occupations, were added and reported in an "Others" category.

Multiplying the proportion of graduates in each of the selected three occupations categories and "Others" category times the number of graduates expected to enter the labor force in future years for each program provided an estimate of the number of graduates in future years expected to enter each occupation. The results of this process are presented in the columns headed, "Enter occupation" of Table I shown as Exhibit 2.

Table 8

Job Selection Pattern for Graduates of Carpentry Program,
School Year 1976-1977

Census code	Occupation	Number selected	Percent selected
283	Sales clerks	1	0.8
321	Estimators and investigators, n.e.c.	1	0.8
331	Mail carriers, post office	1	0.8
411	Brickmasons and stonemasons, apprent.	1	0.8
413	Cabinetmakers	5	3.8
415	Carpenters	85	64.9
416	Carpenter apprentices	24	18.3
441	Foremen, n.e.c.	2	1.5
473	Automobile mechanics	1	0.8
602	Assemblers	1	0.8
750	Carpenters' helpers	2	1.5
751	Construction laborers, exc. carp. help	3	2.3
780	Miscellaneous laborers	1	0.8
785	Not specified laborers	1	0.8
821	Farm foremen	2	1.5
	Total	131	100.0%

Exhibit 2

Section of Table I in State Plan for Vocational-Technical Education Relating to Post Secondary Vocational Education Programs in Minnesota, July 1, 1979-June 30, 1980.

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
01. 0100	Agricultural Production	220	228	235	206	214	220	Farmers (Owners and Tenants)	88	92	94	1775	71491
								Farm Laborers, Wage Workers	49	51	52	295	15997
								Others	69	71	73		
01. 0104	Farm Management	48	42	55	47	41	53	Farmers (Owners and Tenants)	11	9	12	1775	71491
								Farm Laborers, Wage Workers	27	24	31	295	15997
								Others	9	8	11		
01. 0200	Agriculture Supplies and Service	159	167	185	150	157	174	Other Managers, Officials	41	43	47	5605	116705
								Farmers (Owners and Tenants)	22	23	26	1775	71491
								Other Sales Workers	13	14	15	4040	91275
								Others	74	78	86		
01. 0300	Farm Equipment Mechanic	142	150	156	133	141	146	Farm Implement Mechanics	55	58	61	160	3348
								Other Craft Workers	15	16	17	1475	30830
								Farm Laborers, Wage Workers	13	13	14	295	15997
								Others	50	53	55		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
01. 0302	Farm Building and Conveniences	26	24	21	26	24	21	Carpenters	9	8	7	670	21809
								Misc. Machine Operator	9	8	7	975	24899
								Construction Laborers, exc. Carp.	9	8	7	125	13443
01. 0500	Horticulture Aide	58	62	75	42	45	54	Gardeners, Groundskeeper, exc Farm	10	10	12	350	5989
								Waiters	10	10	12	2785	35572
								Sales Manager	6	7	8	680	15019
								Others	16	17	21		
01. 0502	Floral Production	16	20	9	11	14	7	Other Clerical Workers	5	6	3	4430	53030
								Others	7	9	4		
01. 0504	Landscape Technology	183	184	148	157	158	127	Gardners, Groundskeeper, exc Farm	60	60	48	350	5989
								Other Sales Workers	11	11	9	4040	91275
								Others	86	86	69		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational 2 Program	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
01. 0600	Natural Resources Technology	52	52	72	52	52	72	Other Professional, Technical Blue Collar Workers Supervisor Others	16 8 27	16 8 27	23 11 38	1320 1100	37775 30712
01. 0703	Forest Harvesting Technology	35	40	64	25	28	45	Other Operatives Others	14 10	16 12	26 19	1285	36680
04. 0100	Advertising	72	169	273	63	148	239	Other Sales Workers Others	56 27	84 63	137 102	4040	91275
04. 0200	Fashion Merchandising	229	192	201	209	175	183	Other Sales Workers Sales Manager Others	107 36 66	90 30 55	94 31 58	4040 680	91275 15019

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational 2 Program	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
04. 0400	Finance and Credit Management	45	50	66	45	50	66	Bank Tellers	10	11	15	570	6431
								Estimators, Investigators, nec.	10	11	15	410	7246
								Other Clerical Workers	10	11	15	4430	53030
								Others	15	17	22		
04. 0500	Floral Sales	38	48	38	35	44	34	Other Craft Workers	24	30	24	1475	30830
								Others	11	13	11		
04. 0600	Supermarket Management	80	69	51	80	69	51	Sales Manager	27	23	17	680	15019
								Other Managers, Officials	27	23	17	5605	116705
								Others	27	23	17		
04. 0800	Sales Marketing and Management	514	622	721	463	560	650	Other Managers, Officials	66	80	93	5605	116705
								Other Sales Workers	181	219	254	4040	91275
								Real Estate Agents, Brokers	20	24	28	395	5830
								Others	195	237	274		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

C.I.P. Code1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
04. 1000	Interior Design	116	120	127	90	93	99	Other Sales Workers	24	25	26	4040	91275
								Other Craft Workers	24	25	26	1475	30830
								Other Managers, Officials	14	15	16	5605	116705
								Others	28	29	31		
04. 1200	Professional Sales	25	23	24	17	15	16	Other Sales Workers	11	10	11	4040	91275
								Others	6	5	5		
04. 1201	Vending Repair and Merchandising	28	36	44	28	36	44	Other Crafts Workers	10	13	16	1475	30830
								Others	18	23	28		
04. 1300	Insurance Sales	8	12	19	8	12	19	Insurance Agents, Brokers	4	6	9	395	9006
								Others	4	6	9		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
04. 1800	Arena Management	15	21	..	14	20	35	Other Managers, Officials	3	4	6	5605	116705
								Other Sales Workers	7	10	17	4040	91275
								Others	4	6	11		
04. 1801	Recreation Sporting Goods Management	44	44	69	44	44	69	Other Sales Workers	33	33	51	4040	91275
								Others	11	11	17		
04. 1802	Travel Planner	35	66	84	29	55	70	Other Sales Workers	16	31	39	4040	91275
								Other Clerical Workers	5	9	11	4430	51030
								Others	8	15	20		
04. 1900	Distribution Transport Management	37	39	41	32	34	35	Shipping, Receiving Clerks	13	14	15	425	9477
								Fork Lift, Two Motor Operator	8	8	9	230	5521
								Others	11	11	12		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational 2 Program	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
07. 0101	Dental Assistant	267	299	320	240	268	287	Dental Assistants	211	236	253	285	2894
								Others	29	32	34		
07. 0103	Dental Lab Technician	40	40	33	40	40	33	Clinical Lab Technologists & Tec.	13	13	11	330	5663
								Other Craft Workers	13	13	11	1475	30830
								Dental Assistants	13	13	11	285	2894
07. 0203	Medical Lab Assistant	154	152	159	140	138	144	Clinical Lab Technologists & Tec.	123	121	126	330	5663
								Others	18	17	18		
07. 0205	Ward Clerk	158	167	199	129	136	162	Other Clerical Workers	66	69	83	4430	53030
								Secretaries, Medical	26	28	33	290	2423
								Receptionists	9	9	11	1170	12709
								Others	28	30	36		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
07. 0302	Licensed Practical Nurse	1042	1104	1005	927	982	894	Practical Nurses	844	894	814	1860	13784
								Others	83	88	80		
07. 0303	Nurse Aide	1477	1095	1191	1068	792	861	Nurses Aides, Orderlies	709	525	571	2895	29938
								Other Clerical Workers	47	35	38	4430	53030
								Assembler	37	28	30	2275	31716
								Other	275	204	222		
07. 0304	Human Service Assistant	115	111	121	96	93	101	Nurses Aides, Orderlies	38	37	40	2895	29938
								Health Aides, exc nursing	27	26	28	435	3943
								Other Clerical Workers	9	9	9	4430	53030
								Others	22	22	24		
07. 0305	Surgical Technician	97	130	169	83	111	145	Other Professional, Technical	57	77	100	1320	37775
								Others	26	34	45		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code1	Vocational Educational 2 Program	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
07. 0603	Optometric Assistant	42	64	98	37	56	85	Opticians, Lens Grinders	25	39	59	105	1347
								Others	11	17	26		
07. 0900	Bio Medical Equipment Technician	16	26	22	16	26	22	Electrical, Electronic Technician	8	13	11	220	5316
								Other Professional, Technical	3	5	4	1320	37775
								Others	5	8	6		
07. 0903	Inhalation Therapist	67	68	117	63	64	110	Other Professional, Technical	59	59	102	1320	37775
								Others	5	5	8		
07. 0904	Medical Assistant	72	75	13	55	58	10	Receptionists	8	8	1	1170	12709
								Nurses Aides, Orderlies	14	14	3	2895	29938
								Others	34	35	6		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
07. 0905	Central Service Technician	25	20	8	20	16	6	Health Aides, exc Nursing	11	9	3	435	3943
								Others	9	7	3		
07. 0907	Paramedic	25	26	30	23	24	28	Health Aides, exc Nursing	16	17	19	435	3943
								Others	7	7	8		
09. 0201	Child Care Assistant	175	169	168	149	144	143	Other Clerical Workers	72	69	69	4430	53030
								Child Care Workers, exc Private	21	20	20	850	9150
								Other Sales Workers	8	7	7	4040	91275
								Others	49	47	47		
09. 0202	Apparel Specialist	85	69	65	68	55	52	Sewers and Stitchers	15	12	12	465	6338
								Others Sales Workers	9	8	7	4040	91275
								Dressmakers, exc Factory	8	6	6	160	2121
								Others	36	29	27		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
09 0203	Food Service Managers	58	64	69	47	52	56	Cooks, exc Private	18	20	21	1690	23947
								Other Service Workers	9	10	17	817	21205
								Others	20	22	24		
09. 0211	Delicatassen and Catering	18	18	26	18	18	26	Waiters	18	18	26	2785	35572
14. 0100	Accounting	852	890	1030	692	723	837	Accountants	107	112	129	915	19017
								Bookkeepers	261	273	316	2370	35028
								Other Clerical Workers	36	37	43	4430	53030
								Others	289	302	349		
14. 0102	Bookkeeping	47	67	90	41	58	77	Secretaries, General	4	6	8	6395	63152
								Bookkeepers	13	19	25	2370	35028
								Other Clerical Workers	3	4	5	4430	53030
								Others	20	29	38		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational 2 Program	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
14. 0105	Bank Clerk	152	164	209	117	126	161	Bank Tellers	46	50	64	570	6431
								Bookkeepers	17	18	23	2370	35028
								Other Clerical Workers	15	16	20	4430	53030
								Others	39	42	54		
14. 0199	Practical Business Management	83	94	162	62	71	121	Billing Clerks	14	16	27	345	3326
								Bookkeepers	14	16	27	2370	35028
								Others	35	39	67		
14. 0201	Electronic Data Processing	82	115	108	72	101	94	Computer Programmers	27	38	36	280	6367
								Computer, Peripheral Equip. Oper.	31	43	40	325	4535
								Others	14	19	[illegible]		
14. 0202	Data Entry	139	152	197	113	123	160	Computer, Peripheral Equip. Oper.	13	14	18	325	4535
								Keypunch Oper.	43	47	61	150	4337
								Other Clerical Workers	11	12	15	4430	53030
								Others	46	50	64		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational 2 Program	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
14. 0305	Business and Office Clerk	1097	1053	922	951	913	799	Secretaries, General	220	211	185	6395	63152
								Typists	116	111	97	1830	20211
								Other Clerical Workers	130	125	109	4430	53030
								Others	485	466	408		
14. 0308	Medical Clerical	17	12	14	14	10	11	Secretaries, General	4	3	3	6395	63152
								Typists	2	1	2	1830	20211
								Other Clerical Workers	2	2	2	4430	53030
								Others	6	5	5		
14. 0406	Receptionist	48	48	48	39	39	39	Receptionists	23	23	23	1170	12709
								Other Clerical Workers	5	5	5	44 ?	53030
								Others	10	10	10		
14. 0499	Medical Record Technician	18	24	29	17	22	27	Other Professional, Technical	11	14	[illegible]	1320	37775
								Statistical Clerks	5	6	7	380	5169
								Others	2	2	2		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
14. 0503	Purchasing and Inventory Clerk	20	11	15	20	11	15	Buyers, Wholesale, Retail	10	6	8	200	3607
								Stock Clerks, Storekeepers	10	6	8	375	9901
14. 0601	Educational Aide	38	53	52	33	46	45	Other Clerical Workers	17	23	23	4430	53030
								Others	17	23	23		
14. 0701	Administrative Secretary	19	15	13	17	13	11	Secretaries, General	8	7	6	6395	63152
								Typists	2	2	2	1830	20211
								Bank Tellers	2	2	2	570	6431
								Others	4	3	2		
14. 0703	Stenographic Clerical	89	106	133	79	94	118	Secretaries, General	33	39	49	6395	63152
								Bookkeepers	7	9	11	2370	35028
								Other Clerical Workers	11	13	16	4430	53030
								Others	28	33	41		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
14. 0705	General Secretary	872	809	862	745	691	736	Secretaries, General	290	269	287	6395	63152
								Typists	92	85	91	1830	20211
								Other Clerical Workers	80	74	79	4430	53030
								Others	283	263	280		
14. 0707	Legal Secretary	306	298	326	279	272	297	Secretaries, Legal	90	88	96	325	2870
								Secretaries, General	98	96	105	6395	63152
								Stenographers	20	19	21	50	2311
								Others	71	69	75		
14. 0708	Hospital Station Secretary	63	63	68	46	46	49	Secretaries, General	23	23	25	6395	63152
								Other Clerical Workers	5	5	5	4430	53030
								Others	18	18	19		
14. 0709	Medical Secretary	336	326	304	300	291	271	Secretaries, Medical	115	112	104	290	2423
								Secretaries, General	59	57	53	6395	63152
								Other Clerical Workers	43	42	39	4430	53030
								Others	84	81	75		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
16. 0101	Air Traffic Control	30	30	45	30	30	45	Other Professional, Technical	8	8	11	1320	37775
								Other Sales Workers	8	8	11	4040	91275
								Bartenders	8	8	11	350	6236
								Others	8	8	11		
16. 0103	Architectural Drafting	109	111	106	87	88	84	Drafters	61	62	59	300	8705
								Other Professional, Technical	7	7	7	1320	37775
								Others	18	18	17		
16. 0105	Chemical Technology	35	38	39	33	35	37	Other Professional, Technical	20	21	22	1320	37775
								Clinical Lab Technologists & Tec.	3	3	3	330	5663
								Others	10	11	11		
16. 0106	Civil Highway Technology	123	126	151	117	119	143	Drafters	21	21	25	300	8705
								Surveyors	16	16	19	55	1581
								Other Professional, Technical	26	27	32	1320	37775
								Others	54	56	67		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
16. 0107	Cable T.V. Technician	29	29	23	24	24	19	Other Professional, Technical	16	16	13	1320	37775
								Others	8	8	6		
16. 0108	Electronic Technology	592	479	492	574	464	477	Electrical, Electronic Tec.	226	183	188	220	5316
								Other Professional, Technical	147	119	122	1320	37775
								Other Craft Workers	85	68	70	1475	30830
								Others	116	94	96		
16. 0109	Electro-Mechanical Technology	79	79	77	77	77	74	Electrical, Electronic Tec.	9	9	8	220	5316
								Other Professional, Technical	20	20	19	1320	37775
								Other Craft Workers	14	14	14	1475	30830
								Others	34	34	33		
16. 0110	Environmental Technology	43	52	64	30	36	44	Other Professional, Technical	19	22	28	1320	37775
								Others	11	13	17		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational 2 Program	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
16. 0111	Industrial Energy Systems	44	53	83	42	51	79	Other Professional, Technical Other Craft Workers Others	16 11 16	19 13 19	29 21 29	1320 1475	37775 30830
16. 0112	Instrumentation Technician	30	28	23	26	25	20	Other Craft Workers Others	16 10	15 10	12 8	1475	30830
16. 0113	Quality Control Technician	9	63	112	8	59	104	Drafters Others	6 3	40 19	71 33	300	8705
16. 0114	Industrial Technology	62	68	49	58	63	45	Other Craft Workers Other Professional, Technical Others	19 29 10	21 32 11	15 23 8	1475 1320	30830 37775

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code[1]	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings#7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
16. 0203	Food Lab and Management	34	18	27	17	9	13	Other Professional, Technical Other Craft Workers	9 9	5 5	7 7	1320 475	37775 30830
16. 0300	Electro Medical Technician	10	10	10	10	10	10	Nurses Aides, Orderlies	10	10	10	2895	29938
16. 0703	Electronic Communication Tec.	18	17	14	18	17	14	Electrical, Electronic Tec. Radio, Television Repairs Others	5 9 4	5 9 3	4 7 3	220 65	5316 2393
16. 0704	Communication Technology	81	82	95	81	82	95	Other Professional, Technical Household Appliance Mechanic Other Operatives Others	21 11 11 39	21 11 11 39	25 12 12 45	1320 95 1285	37775 2629 36680

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
16. 0705	Fluid Power Technician	111	139	20	98	123	18	Other Professional, Technical	30	38	5	1320	37775
								Excavating, Grading Maching Oper.	15	19	3	230	7276
								Other Craft Workers	23	28	4	1475	30830
								Others	30	38	5		
17. 0100	Air Conditioning Refrigeration	142	156	101	133	146	95	Air Cond., Heating Refrig., Mech.	96	61	40	160	2477
								Household Appliance Mechanic	17	19	12	95	2629
								Others	60	66	43		
17. 0200	Appliance Repair	64	60	78	58	54	70	Household Appliance Mechanic	25	24	31	95	2629
								Other Craft Workers	7	7	9	1475	30830
								Assemblers	7	7	9	2275	31716
								Others	18	17	22		
17. 0301	Auto Body	395	391	384	336	332	327	Auto Body Repairs	184	182	179	40	3325
								Others	152	150	148		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 0302	Auto Mechanics	1000	1033	1022	915	946	936	Auto Mechanics	484	500	495	580	19305
								Other Craft Workers	60	62	61	1475	30830
								Others	371	383	379		
17. 0399	Parts Person Training	226	195	216	192	165	183	Other Sales Workers	62	54	60	4040	91275
								Other Manager, Officials	21	18	20	5605	116705
								Auto Mechanics	18	16	18	580	19305
								Others	90	78	86		
17. 0401	Aircraft Mechanics	115	129	154	97	108	129	Aircraft Mechanics	58	65	77	60	2213
								Other Craft Workers	10	11	13	1475	30830
								Timber Cutting, Logging Worker	10	11	13	30	1762
								Others	19	22	26		
17. 0600	Office Machines Service	40	36	37	35	32	33	Other Craft Workers	29	26	27	1475	30830
								Others	6	5	5		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 0700	Commercial Art	135	153	132	115	130	112	Painters, Sculptors	46	53	45	170	2718
								Other Professional Technical	16	19	16	1320	37775
								Compositor, Typesetter	16	19	16	90	3643
								Others	35	40	35		
17. 0900	Commercial Photography	47	47	37	37	37	28	Photographers	7	7	6	55	1662
								Photographic Process Workers	13	13	10	115	1672
								Others	16	16	13		
17. 0901	Photographic Technology	39	44	37	35	39	32	Other Craft Workers	9	10	8	1475	30830
								Others	26	29	24		
17. 1000	Construction	114	123	153	114	123	153	Heavy Equipment Mechanics	63	68	85	490	13397
								Others	51	55	68		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational 2 Program	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 1001	Carpentry	361	433	513	315	378	448	Carpenters Other Craft Workers Others	198 66 52	237 79 62	281 94 73	670 1475	21809 30830
17. 1002	Electrical Technology	274	321	382	284	310	369	Electricians Other Craft Workers Others	90 133 61	98 146 66	117 173 79	345 1475	9361 30830
17. 1003	Diesel and Truck Mechanics	57	70	49	48	59	41	Heavy Equipment Mechanics Other Craft Workers Auto Mechanics Others	13 8 6 21	16 9 7 26	12 7 5 18	490 1475 580	13397 30830 19305
17. 1004	Bricklaying	41	36	31	38	34	29	Brick & Stone Masons Others	26 12	23 10	20 9	30	3107

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational 2 Program	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 1005	Painting and Decorating	57	59	55	57	59	55	Painters	34	35	32	260	7099
								Other Craft Workers	16	16	15	1475	30830
								Others	8	8	7		
17. 1007	Plumbing	100	110	96	92	101	89	Plumbers, Pipefitters	34	37	32	220	7264
								Other Craft Workers	43	47	41	1475	30830
								Others	16	17	15		
17. 1011	Maintenance Mechanic	134	140	142	113	118	119	Heavy Equipment Mechanics	25	26	27	490	13197
								Carpenters	14	14	15	670	21809
								Other Craft Workers	14	14	15	1475	30830
								Others	60	63	63		
17. 1100	Custodial and Building Maintnc	43	56	91	39	50	82	Janitors & Sextons	23	30	49	1550	31409
								Others	15	20	33		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 1200	Diesel and Truck Mechanic	341	344	342	319	322	320	Heavy Equipment Mechanics	169	171	170	490	13397
								Auto Mechanics	20	20	20	580	19305
								Other Craft Workers	57	58	58	1475	30830
								Others	73	72	72		
17. 1201	Truck Driving	302	311	335	252	259	279	Truck Drivers	157	161	174	800	30835
								Other Professional, Technical	14	14	16	1320	37775
								Others	81	84	90		
17. 1301	Architectural Drafting	127	132	93	115	119	84	Drafters	42	44	31	300	8705
								Other Sales Workers	10	10	7	4040	91275
								Estimators, Investigators, NEC.	10	10	7	410	7246
								Others	52	54	38		
17. 1302	Mechanical Drafting	246	260	329	226	239	302	Drafters	149	158	200	300	8705
								Other Professional, Technical	15	16	20	1320	37775
								Constr, Laborers, exc., Carp. Help	19	20	26	125	13443
								Others	42	45	56		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 1303	Technical Drafting	15	15	21	14	14	20	Drafters Others	12 3	12 3	16 4	300	8705
17. 1304	Construction Drafting	49	42	53	39	34	42	Drafters Others	39	34	42	300	8705
17. 1402	Electrical Line Person	52	54	53	52	54	53	Electric Power Line Installers, Repair Other Craft Workers Others	14 34 5	14 35 5	14 35 5	60 1475	2422 30830
17. 1403	Electric Motor Winding + repr.	17	18	24	17	18	24	Other Craft Workers Others	14 3	14 4	19 5	1475	30830

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 1501	Telephone Communication Tec	79	78	85	74	73	80	Other Professional, Technical	12	12	13	1320	37775
								Telephone Installers, Repairers	15	17	16	165	9534
								Other Craft Workers	29	29	32	1475	30830
								Others	18	17	19		
17. 1502	Audio Visual Technology	49	61	55	47	58	52	Other Clerical Workers	10	13	12	4430	53030
								Radio, Television Repairers	23	29	26	65	2393
								Others	13	16	14		
17. 1503	Radio and Television Repair	58	53	58	58	53	58	Radio, Television Repairers	34	31	34	65	2393
								Data Processing Machines Repairer	6	6	6	95	1680
								Others	18	17	18		
17. 1900	Graphic Arts	342	407	396	320	381	370	Printing Press Opr.	96	114	111	140	3722
								Compositors, Typesetters	43	51	50	90	3643
								Other Craft Workers	46	55	53	1475	30830
								Others	135	161	157		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation6			Annual Job Openings7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 1902	Printing-Offsets	36	53	87	29	42	70	Printing Press Opr. Others	19 10	28 14	46 23	140	3722
17. 2101	Optical Technology	57	57	54	57	57	54	Opticians, Lens Grinders Others	43 14	43 14	40 13	105	1347
17. 2102	Watch Making	18	18	18	18	18	18	Other Craft Workers Others	16 2	16 2	16 2	1475	30830
17. 2312	Machine Shop Trades	345	390	344	316	357	315	Machinists Other Craft Workers Other Operatives Others	108 40 36 133	122 45 41 150	107 39 36 132	235 1475 1285	8332 30830 36680

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 2303	Production Machinist	74	90	89	62	75	74	Machinist	15	18	18	23	8332
								Grinding Machine Oper.	7	9	9	45	1971
								Lathe, Milling Machine Oper.	7	9	9	35	1870
								Others	33	40	39		
17. 2305	Sheet Metal Design	65	62	65	53	51	53	Sheet metal Workers	21	20	21	90	3868
								Air Cond., Heating, Refrig. Mechanic	9	8	9	160	2477
								Others	23	22	24		
17. 2306	Welding	705	701	748	631	627	669	Welders & Flame-cutters	363	361	386	570	13023
								Other Craft Workers	36	36	38	1475	30830
								Others	231	230	245		
17. 2307	Tool and Die Machinist	228	215	249	195	184	212	Machinist	48	45	52	235	8332
								Tool and Die Makers	23	21	25	100	3202
								Other Craft Workers	59	56	65	1475	30830
								Others	65	61	71		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 2309	Pattern Maker	10	10	14	10	10	14	Other Craft Workers	10	10	14	1475	30830
17. 2399	Jewelry Repair	13	13	11	13	13	11	Receptionists Other Craft Workers	7 7	7 7	5 5	1170 1475	12709 30830
17. 2601	Barbering	10	10	9	10	10	9	Barbers	10	10	9	60	2451
17. 2602	Cosmetology	372	385	391	323	334	340	Hairdressers, Cosmetologists Others	247 76	255 79	259 80	890	9911

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 2700	Plastic Injection Mold Making	27	26	18	27	26	18	Carpenters	9	9	6	670	21809
								Machinists	9	9	6	235	8332
								Others	9	9	6		
17. 2802	Law Enforcement	86	103	125	76	91	111	Police and Detectives	53	63	77	175	7245
								Others	24	28	34		
17. 2801	Baking	40	37	24	34	31	20	Bakers	7	6	4	95	2703
								Other Craft Workers	11	10	7	1475	30830
								Others	16	15	10		
17. 2902	Food Preparation Cooking	612	608	[illegible]	522	519	631	Cooks, exc. private	219	217	264	1690	23947
								Other Service Workers	49	49	60	817	21205
								Restaurant, Cafe, Bar Mgrs.	39	39	47	380	9951
								Others	215	214	260		

Exhibit 2 (Cont.)

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1980	1982	1979	1980	1982		1979	1980	1982		
17. 2903	Meat Cutting	155	153	126	146	144	119	Meat Cutters, Butchers, exc. Mfg.	71	70	58	80	3547
								Meat Cutters, Butchers	11	11	9	125	3893
								Truck Drivers	11	11	9	800	30835
								Others	54	53	43		
17. 3100	Small Engine Repair	268	266	298	222	220	247	Other Craft Workers	94	94	105	1475	30830
								Carpenters	10	10	12	670	21809
								Others	117	116	131		
17. 3200	Total Energy	15	10	11	13	9	9	Other Sales Workers	3	2	2	4040	91275
								Assemblers	3	2	2	2275	31716
								Janitors & Sextons	3	2	2	1550	31409
								Others	3	2	2		
17. 3302	Tailoring	33	30	17	33	3[illegible]	17	Other Sales Workers	11	10	6	4040	91275
								Sewers and Stitchers	11	10	6	465	6338
								Other Operatives	11	10	6	1285	36680

Table 1. Employment Opportunities Related to Vocational Education Programs, Labor Demand and Supply in Minnesota, 1979-1982, Post Secondary Programs

O.E. Code 1	Vocational Educational Program 2	Graduates 3			Enter Employment 4			Most Frequent Occupations Selected 5	Enter Occupation 6			Annual Job Openings 7	Total Employment 1979 8
		1979	1981	1982	1979	1980	1982		1979	1980	1982		
17. 3402	Shoe Repair	8	8	1	5	5	1	Other Craft Worker	3	3	0	1475	30830
								Other Operatives	3	3	0	1285	36680
17. 3500	Upholstery	28	28	33	24	24	28	Other Managers, Officials	8	8	9	5605	116705
								Other Craft Worker	16	16	19	1475	30830
17. 3601	Cabinet Making	95	111	130	91	106	125	Carpenters	13	15	17	670	21809
								Cabinet makers	35	41	49	60	1731
								Other Craft Workers	15	18	21	1475	30830
								Others	28	33	38		
17. 4002	Musical String Instrument	18	17	23	14	14	19	Other Craft Workers	4	3	5	1475	30830
								Others	11	10	14		

Summary

Following the procedure described in this chapter resulted in the portion of Table I of the FY 1980 Minnesota State Plan for Vocational-Technical Education covering post-secondary vocational education programs. This part of the Table is shown as all except the last two columns of Exhibit 2. The source of data in each column is as follows:

Column heading	Source
OE code	U.S. Office of Education code assigned to each vocational education program
Vocational Education program	Title of program assigned using U.S. Office of Education coding structure
Graduate	Step 1 in this chapter
Enter employment	Step 2 in this chapter
Most frequent occupation selected	Step 3 in this chapter
Enter occupation	Step 3 in this chapter

Chapter IV

PROJECTED EMPLOYMENT REQUIREMENTS

Employment requirements are an estimate of the work positions which are needed by the economy; usually they are specific to a certain time (e.g., year, five years) and geographic area (e.g., county, state, nation). Estimates of employment requirements are made under specific assumptions about such variables as rate of technological changes, inflation, unemployment rate, and wage rates. Source data for projected employment requirements in Minnesota was Minnesota Employment Trends 1974-1985 published by the Minnesota Department of Economic Security (1978). This publication contains estimates of total employment for 1970 and outlook for 1974-1985. The outlook includes information on percent of growth, replacement needs, and annual average job openings for each of approximately 200 occupational categories.

Step 1: Estimating Total Employment in Specific Occupations

For the purpose of preparing Table I of the State Plan, estimates of total employment for each occupation in Minnesota for 1979 were derived using the following formulas:

1. Average annual growth rate, 1974-1985 = [(% growth, 1974-1985)/11 years]
2. Average annual growth, 1974-1985 = (1974 total employment) x (average annual growth rate, 1974-1985)
3. Growth, 1974 to 1979 = (Average annual growth, 1974-1985) x (5 years)
4. Total employment in 1979 = (1974 total employment) + (growth, 1974 to 1979)

Step 2: Estimating Annual Job Openings in Specific Occupations

The annual job opening information was taken directly from the Minnesota Department of Economic Security publication cited above except for information about occupations not included in the tables for specific occupations in the publication. The procedure used for these "Other" occupations is described in the next paragraph.

Not all occupations are included in the approximately 200 occupational

categories shown in the Minnesota Department of Economic Security publication. Occupations which are small in terms of total employment are excluded because of the larger error which would likely result if estimates of employment requirements were made. To accommodate these occupations in preparing Table I, they were grouped under nine major occupational categories and designated "Others" within each of the major occupational groups. The major occupational groups were: Other Professional, Technical; Other Managers, Officials; Other Sales Workers; Other Clerical Workers; Other Craft Workers; Other Operative Workers; Other Service Workers; Other Laborers; and Other Farmers and Farm Laborers.

For the purpose of calculating total employment in 1979 and annual job openings for each of the "Other" categories, the following formulas were used:

1. To estimate "Other" total employment --
   1.1 Total employment in an "Other" major occupational category, 1974 = (total employment in the major occupational category, 1974) - (total employment in listed occupations in the major occupational category, 1974).
   1.2 Total employment in an "Other" major occupational category, 1985 = (total employment in the major occupational category, 1985) - (total employment in listed occupations in the major occupational category, 1985).

   Note. "Listed occupations refers to those occupations for which data were already displayed in the Minnesota Department of Economic Security publication. Total employment in the major occupational category was taken directly from the Minnesota Department of Economic Security publication (p. 42).
2. To estimate "Other" annual growth in total employment in a major occupational category, 1974-1985 --
   "Other" annual growth = [(total employment in "Other" major occupational category, 1985) - (total employment in "Other" major occupational category 1974)]/(11 years)
3. To estimate "Other" total employment in a major occupational group, 1979 --
   Total employment in "Other" major occupational group, 1979 = (total employment in the "Other" major occupational group, 1974) + [(5 years) x (annual growth in the "Other" major occupational category, 1974-1985)]
4. To estimate average annual "Other" replacement needs in a major occupational group --

It was assumed that replacement rates for 1974 and 1985 for each occupational group will remain constant and be the same as provided by the Minnesota Department of Economic Security. Those replacement rates are shown in Appendix V.

4.1 Replacement in an "Other" major occupational category, 1974 = (total employment in the "Other" major occupational category, 1974) x (replacement rate for the "Other" major occupational category)

4.2 Replacement in an "Other" major occupational category, 1985 = (total employment in the "Other" major occupational category, 1985) x (replacement rate in the "Other" major occupational category)

4.3 Average annual replacement in an "Other" major occupational category = [(replacements in the "Other" major occupational category, 1974) + (replacements in the "Other" major occupational category, 1985)]/2

5. To estimate average annual job openings for 1974-1985 in an "Other" major occupational category

Average annual job openings in an "Other" major occupational category = (annual growth in the "Other" major occupational category) + (average annual replacement in the "Other" major occupational category)--

The estimates of total employment for 1979 and average annual job openings, 1974-1985, are shown in Table 9.

Step 3: Listing Total Employment and Annual Job Openings

Information presented in Table 9 was used to list the estimates shown in Table I under the column headings of "Annual Job Openings" and "Total Employment 1979". Table I is shown in this report as Exhibit 1 and 2 for secondary and post-secondary programs, respectively. The two columns in question are the last two in the Table. For each of the specific occupations listed in the column headed "Most Frequent Occupation Selected", the corresponding annual job openings and total employment for 1979 were listed from Table 9. Obviously, where specific occupations are listed more than once, the annual job openings and total employment are also multiply listed. Based on follow-up data, it is a reality that graduates from several programs compete for the same occupations.

Table 9

Annual Job Openings and Total Employment in 1979 and Average Annual Job Openings, 1974-1985, for Minnesota

Occupational Code	Occupational title	Average annual job openings 1974-1985	Total employment 1979
1101	Engineers, civil	75	3188
1102	Engineers, electrical	205	6375
1103	Engineers, industrial	125	3772
1104	Engineers, mechanical	140	4642
1105	Chemists	70	1991
1106	Drafters	300	8705
1107	Electrical, electronic technicians	220	5316
1108	Dentists	160	2640
1109	Pharmacists	150	2959
1110	Physicians, medical, osteopaths	365	7268
1111	Registered nurses	1920	20829
1112	Clinical lab technologists and technicians	330	5663
1113	Radiologic technologists and technicians	215	1901
1114	Surveyors	55	1581
1115	Airplane pilots	55	2136
1116	Computer programmers	280	6367
1117	Computer systems analysts	140	3032
1118	Economists	115	1915
1119	Adult education teachers	85	1931
1120	College and university teachers	225	10222
1121	Elementary school teachers	1495	30115
1122	Preschool and kindergarten teachers	175	2761
1123	Secondary school teachers	560	25862
1124	Editors and reporters	220	3302
1125	Musicians and composers	235	3417
1126	Photographers	55	1662
1127	Painters and sculptors	170	2718

Table 9 (continued)

Annual Job Openings and Total Employment in 1979 and Average Annual Job Openings, 1974-1985, for Minnesota

Occupational Code	Occupational title	Average annual job openings 1974-1985	Total employment 1979
1128	Public relations specialists	110	1950
1129	Accountants	915	19017
1130	Clergy	335	8180
1131	Lawyers	400	7388
1132	Librarians	205	2970
1133	Personnel, labor relations	365	6838
1134	Research workers n.e.c.	220	3493
1135	Recreation workers	255	2713
1136	Social workers	625	7697
1137	Vocational and education counselor	175	3427
1138	Therapists	395	3833
1139	Agricultural, biological tech. except health	110	1692
1140	Architects	60	1403
1141	Other professional, technical	1320	37775
1201	Bank, financial managers	740	11493
1202	Buyers, wholesale and retail	200	3607
1203	Purchasing agents and buyers	170	3902
1204	Sales managers	680	15019
1205	Inspectors, except construction, public	110	2303
1206	Health administrators	405	4156
1207	Managers, superintendents, building	185	2156
1208	Officials of lodges, unions	135	2462
1209	Office managers, n.e.c.	465	7850
1210	Officials and administrators, public	195	5217
1211	School administrators	180	5365
1212	Restaurant, cafe and bar managers	380	9951
1213	Credit Managers	70	1538

Table 9 (continued)

Annual Job Openings and Total Employment in 1979 and Average Annual Job Openings, 1974-1985, for Minnesota

Occupational Code	Occupational title	Average annual job openings 1974-1985	Total employment 1979
1214	Other Managers, officials, proprietors	5605	116705
1301	Hucksters and Peddlers	195	5127
1302	Insurance agents, brokers	395	9006
1303	Real estate agents, brokers	395	5830
1304	Stock and bond agents	105	2407
1305	Other sales workers	4040	91275
1401	Secretaries, legal	325	2870
1402	Secretaries, medical	290	2423
1403	Secretaries, general	6395	63152
1404	Stenographers	50	2311
1405	Bookkeeping, billing machine operators	95	2709
1406	typists	1830	20211
1407	Computer, peripheral equipment operators	325	4535
1408	Key punch operators	150	4337
1409	Bank tellers	570	6431
1410	Cashiers	1715	21336
1411	Billing clerks	345	3326
1412	Bookkeepers	2370	35028
1413	Counter clerks, except food	675	8274
1414	Estimators, investigators, n.e.c.	410	7246
1415	Expeditors, production controllers	225	4058
1416	File clerks	385	4581
1417	Insurance adjuster, examiners	160	2963
1418	Library attendants, assistants	235	3163
1419	Mail carriers, post office	90	5030
1420	Postal clerks	120	5522
1421	Mail handlers, except post office	280	3630

Table 9 (continued)

Annual Job Openings and Total Employment in 1979 and Average Annual Job Openings, 1974-1985, for Minnesota

Occupational Code	Occupational title	Average annual job openings 1974-1985	Total employment 1979
1422	Payroll, timekeeping clerks	240	3247
1423	Receptionists	1170	12709
1424	Shipping, receiving clerks	425	9477
1425	Statistical clerks	380	5169
1426	Stock clerks, storekeepers	375	9901
1427	Telephone operators	374	5780
1428	Clerical supervisors	205	3413
1429	Other clerical workers	4430	53030
1501	Carpenter	670	21809
1502	Brick and stone masons	30	3107
1503	Bulldozer operators	115	2451
1504	Electrician	345	9361
1505	Excavating, grading machine operators	230	7276
1506	Painters	260	7099
1507	Plumbers	220	7264
1508	Blue collar worker supervisor	1100	30712
1509	Machinists	235	8332
1510	Sheetmetal workers	90	3868
1511	Tool and die makers	100	3202
1512	Air cond., heating refrig. mechanic	160	2477
1513	Aircraft mechanic	60	2213
1514	Auto body repairers	40	3325
1515	Auto mechanics	580	19305
1516	Farm implement mechanic	160	3348
1517	Heavy equipment mechanic	490	13397
1518	Household appliance mechanic	95	2629
1519	Radio, television repairers	65	2393

Table 9 (continued)

Annual Job Openings and Total Employment in 1979 and Average Annual Job Openings, 1974-1985, for Minnesota

Occupational Code	Occupational title	Average annual job openings 1974-1985	Total employment 1979
1520	Railroad and car shop mechanic	40	1520
1521	Compositors, typesetters	90	3643
1522	Printing press operators	140	3722
1523	Electric power line installer, repairs	60	2422
1524	Telephone installers, repairers	165	5534
1525	Bakers	95	2703
1526	Cabinetmakers	60	1731
1527	Crane, derrick, and hoist operators	55	2331
1528	Structural metal craft workers	35	1533
1529	Stationary engineers	115	4310
1530	Millwrights	90	1578
1531	Data processing machine repairers	95	1680
1532	Carpet installers	45	1420
1533	Opticians, lens grinders	105	1347
1534	Other craft workers	1475	30830
1601	Drill press operators	45	1517
1602	Grinding machine operators	45	1971
1603	Lathe, milling machine operators	35	1870
1604	Punch stamping press operators	105	3523
1605	Welders, flamecutters	570	13023
1606	Checkers, examiners, mfg.	720	11834
1607	Packer, wrapper, except meat products	770	13218
1608	Assembler	2275	31716
1609	Clothing ironers, pressers	80	1882
1610	Bottling, canning operators	65	1744
1611	Dressmaker, except factory	160	2121
1612	Filers, polisher, sanders, buffers	60	1558

Table 9 (continued)

Annual Job Openings and Total Employment in 1979 and Average Annual Job Openings, 1974-1985, for Minnesota

Occupational Code	Occupational title	Average annual job openings 1974-1985	Total employment 1979
1613	Garage workers, gas station attendants	45	12433
1614	Meat cutters, butchers, except mfg.	80	3567
1615	Meat cutters, butchers, mfg.	125	3893
1616	Sawyers	90	2088
1617	Sewers, stitchers	465	6338
1618	Bus drivers	275	6836
1619	Delivery and route workers	380	15523
1620	Fork lift, two motor operators	230	5521
1621	Railroad switch operators	15	1661
1622	Taxicab drivers, chauffeurs	35	1747
1623	Truck drivers	800	30835
1624	Painters, mfg. articles	80	2879
1625	Cutting operatives, n.e.c.	185	4452
1626	Laundry, dry clean oprs., n.e.c.	380	4554
1627	Photographic process workers	115	1672
1628	Winding operatives	110	1928
1629	Misc., machine operatives	975	24899
1630	Other operatives	1285	36680
1701	Lodging quarters cleaners	480	5377
1702	Bldg. interior cleaners	1370	15606
1703	Janitors and sextons	1550	31409
1704	Bartenders	350	6236
1705	Waiters assistants	155	3711
1706	Cooks except private	1690	23947
1707	Dishwashers	280	6376
1708	Food counter, fountain workers	390	4407
1709	Waiters	2785	35572

Table 9 (continued)

Annual Job Openings and Total Employment in 1979 and Average Annual Job Openings, 1974-1985, for Minnesota

Occupational Code	Occupational title	Average annual job openings 1974-1985	Total employment 1979
1710	Dental assistants	285	2894
1711	Health aides, except nursing	435	3943
1712	Nurses aides, orderlies	2895	29938
1713	Pratical nurses	1860	13784
1714	Barbers	60	2451
1715	Child care workers, exc. private household	850	9150
1716	Hairdressers, cosmetologists	890	9911
1717	Housekeepers, exc. private household	175	2742
1718	Firefighters	40	2624
1719	Police and detectives	175	7245
1720	Guards	187	4166
1721	Child care workers, private household	375	8432
1722	Private household cleaners	155	3128
1723	Flight attendants	230	1771
1724	Attendants, recr., and amuse.	105	1947
1725	Other service workers	817	21205
1801	Carpenter helpers	0	1288
1802	Constr. labor, exc. carpenter	125	13443
1803	Freight material handlers	285	12345
1804	Gardners, groundkeepers, exc. farm	350	5989
1805	Timber cutting, logging workers	30	1762
1806	Stock handlers	655	20241
1807	Vehicle washer, equip. cleaner	75	3472
1808	Warehouse workers, n.e.c.	45	3736
1809	Garbage collectors	100	1544
1810	Other laborers	635	14210
1901	Farmers (owners and tenants)	1775	71491

Table 9 (continued)

Annual Job Openings and Total Employment in 1979 and Average Annual Job Openings, 1974-1985, for Minnesota

Occupational Code	Occupational title	Average annual job openings 1974-1985	Total employment 1979
1902	Farm managers	90	1536
1903	Farm laborers, wage workers	295	15997
1904	Farm laborers, unpaid family	570	28362
1905	Other farmers and farm laborers	0	515

Note. An Occupational Code refers to code numbers assigned by the MRDC to occupations listed in Minnesota Employment Trends, 1974-1985. The codes are the same as those used in the cross-classification with Census Codes shown in Appendix III.

Chapter V

DISCUSSION AND RECOMMENDATIONS

The major intent of this report was to provide a description of the procedure used to develop the contents of Table I of the Minnesota State Plan for Vocational-Technical Education during the past three years. This Table makes future projections of the relationship of labor supply from secondary and full-time, day post-secondary vocational education programs, and employment requirements from business and industry. It is important to place the status of development for the procedures and Table contents in context in order to understand what progress has been made and what limitations still exist. This chapter will first discuss context and then make recommendations about how procedures could be improved.

Context

Planning is concerned with deciding both ends and means during some future time. In this case, the substance being planned is vocational education at the secondary, post-secondary and adult levels in Minnesota. Table I of the State Plan is concerned with an even further delimitation, the impact of vocational education on the labor market through its graduates as they seek paid employment. This is only one of a multitude of ways vocational education can have impact. For example, other purposes may be to improve knowledge of occupations or knowledge of self in relation to occupations, prepare for further education, improve work life by encouraging reform and change, or even create new work opportunities through entrepreneurship. These other purposes do not always show up in Table I; the implication is that only one dimension of vocational education is being considered in the Table.

Another part of context is that the Table is limited to using available data and, to this point, no attempts are being made to change trends extrapolated from historic or present data. The content shown in the Table concerning projected supply of labor from vocational education is taken almost totally from data produced by student follow-up systems. The development of the Table is contingent on the timely and accurate production of these data. Projections into the future are based on historic trends in the follow-up information. No

attempt is made to "place a finger on the scale" of history or current happenings. A natural next step, as more confidence is developed in interpreting past trends and future happenings, would be to begin to identify discrepancies between historic extrapolation and what is desired in the "best interests" of students and the larger society. Using this mode of action, planning will result in greater focus on what ought to be and its difference from what is projected to be if things are left to operate as they have been. For example, it might be decided that a program's number of graduates should be reduced by 25 percent over the next five years compared with what it would be if historic trends were left to continue. With this change will come a shift in the planners "mind set" from what is the best projection of what will happen to what ought to happen and what changes will be necessary to obtain the needed adjustment. In a sense, the planner will begin to influence the system (i.e., to make marginal changes) based on some "bigger picture" of what is best.

These comments are not made to underestimate the importance of progress which has been made to date in producing Table I. One needs to start some place; a clear description of "what is" seems a reasonable place for a start. Currently the Table is beginning to provide a picture of "what is" in a consistent and documented way. Further, it provides an indication of "what will likely be" if things are left as they are. Although not the ultimate in planning, it is a milestone along the way. There is "something" to change, that "something" is present reality and its likely extention. In practice, it is reality which needs to be operated on; rarely is a total operation such as vocational education given a go/no-go decision. Rather, marginal changes are made to improve expected operation in the future; sometimes these changes involve reduction in scope -- the reason is still improvement in some larger sense.

Table I, as limited in coverage and feeble in data quality as it may be, is a step forward in the detailed planning of vocational education in Minnesota. Certainly it has far to go, but infancy is past and there is a set of procedures and outcomes to nurture and build upon as a way to improve vocational education in the State.

Recommendations

The recommendations which follow were developed through three years of experience in developing Table I for the State Plan and continuous reflection

of what it could be if . . . . The items forming the resulting list are best judgements about most productive ways to improve Table I given its present status of development. They are not listed in any order of priority. For each recommendation, a brief rationale is provided:

- Develop standards for data bases used in making projections.

  Quality of data in terms of completeness can be a major limitation to an empirical procedure such as represented in the procedures used to derive Table I. Particular attention should be focused on completeness of enrollment data, follow-up response rates by program and school, vocational education program coding and occupation and industry coding of jobs selected by former students. Training procedures for those doing coding and data entry should assist in meeting this recommendation.

- Accumulate historic trends for key data used in the procedure.

  A common "rule of thumb" is that one should have historic data for as many years in the past as one wants to project into the future. Obviously, a stable coding system or at least compatible coding systems are important as prerequisites to developing more useful historic files. The anticipated change to the Standard Occupational Coding System by the U.S. Government should facilitate this process.

- Collect follow-up data on all students who may have benefited from participation in vocational education programs -- this would include those who completed their training objective or withdrew before this point as well as graduates.

  A more encompassing look at those who participate in vocational education and their corresponding impact on the labor market would be possible if follow-up data were collected on those who withdraw as well as complete their training objective or graduate. Currently only the the latter two groups are included in the post-secondary follow-up system. Even data from a sample of those who withdrew would be useful to interpret their impact on the labor market.

- Develop a process to categorize secondary students who have been enrolled in more than one vocational education program area.

  The result of multiple program enrollments is difficult to "sort out" when constructing a table showing enrollments and labor market impact. The issue of single versus multiple counts causes confusion in reading and using tabled information. The point being made here is <u>not</u> that

students should be restricted to enrolling in one program or be counted for accounting purposes in only one program, but that a procedure be developed to present the real situation in a meaningful and easily understood way.

- Determine the effect of time in program as it impacts on the jobs selected by secondary vocational education students.

  With the wide variation in the amount of time which secondary students may spend in any given vocational program, it may be like "mixing apples and oranges" to count them alike as is done in the procedure described in this report. Analysis of the effect of time may also have implications for how to categorize secondary students in Table I (see previous recommendations).

- Determine if students who select part-time employment should be treated separate from those selecting full-time employment for planning purposes.

  Because a number of former students select part-time jobs, particularily at the secondary school level, and because these jobs may well be serving different economic purposes (e.g., support while in school, supplement income, provide temporary support until a more desirable job is found), it may be that the type of impact these students have on the labor market is quite different from those who select full-time employment. In the present procedure, full and part-time jobs are treated the same and grouped together for analysis purposes.

- Develop standard definition of "related" jobs for each vocational education program.

  Related jobs are those in which former students are using an acceptable amount of what they learned in a given vocational education program. The question is what is an "acceptable" amount of use and who should make that determination. In order to contrast the output of a vocational education with the relevant labor market demand, it is necessary to identify those occupations which are going to be called "related" to the program. For consistent interpretation purposes, the definition of what occupations are related must also be consistent and open to inspection by all those doing interpretation.

- Assess the stability with which former students of each program select the same pattern of jobs, year after year and school to school.

As presently done in deriving Table I, it is assumed that future graduates of vocational education will select the same pattern of jobs as selected by students in past years. In effect, it is assumed that the pattern of jobs selected will be stable. If this is not the case, less confidence should be placed in projections unless it is possible to anticipate how the pattern of jobs selected will change. If it is found that the patterns are very stable, it may not be necessary to collect follow-up data each year.

- Incorporate the impact of out-of-state migration of former vocational education students.

  In its current form, Table I displays all vocational education graduates as remaining in the State and being available to fill the State's employment positions. Both secondary and post-secondary follow-up systems provide data on out-of-state migration of students. These data need to be incorporated in the procedure to develop Table I in an acceptable way.

- Develop more detailed information in terms of occupation and geographic location on employment requirements.

  In the present procedure the information on vocational education students from follow-up systems is available for about 450 occupations, 250 industries and 1000 geographic locations; it is aggregated to about 200 occupations for the State in total in preparing Table I. The reason is that employment requirements are available in only this more aggregate format. Perhaps there is some "middle ground" between the detail of the follow-up data and the grossness of the employment requirements projections which would increase the usefulness of Table I. A related matter is the correct interpretation of the exact labor market impact of job openings in occupations in which there is high turnover of workers (i.e., several persons may hold the same job in a single year).

- Incorporate labor market supply from sources other than vocational education.

  In its current format, Table I assumes that there are no other sources of supply except vocational education programs or at least the vocational education graduates will have first choice of available job opportunities; these assumptions are incorrect. Other obvious sources

of supply are other educational programs (e.g., colleges, universities, private vocational schools, high school students not taking vocational education), geographic in-mobility, internal labor market mobility, those currently unavailable for employment, the unemployed, and those leaving the military. These other sources of supply need to be fully enumerated and their labor market impact considered in more detail.

- More detailed analysis of the data shown in Table I.

  Some special analyses of Table I data would ease its interpretation and usability. For example, tables could be constructed to show the largest/smallest programs, highest/lowest related job placement programs, fastest growing/declining programs, and overall impact of vocational education on the labor market. Such tables would provide some insights into the impact of vocational education and a notion of the "bigger picture".

- Experiment with "planned" changes as a way to influence the future impact of vocational education.

  This recommendation would mean conscious choice of "what ought to happen" and then the implementing of corresponding changes to bring it about by those responsible and affected. With this activity, Table I would move to a "second generation" in its development. It would begin to communicate what ought to be as opposed to what will likely happen if things are left as they are. Moving to this second generation can be kept realistic if experience is gained early on how it will likely work.

- Professional review of the contents of Table I before publication.

  Empirical methods of projecting have their limitations. Professionals responsible for vocational education and labor market information should have a rich base of current and diverse information which is not likely incorporated into the empirical procedures. Review and revision of Table I with appropriate reasons by professionals would increase the accuracy and thereby the confidence which could be placed in the Table.

Summary

The procedure to describe the impact of vocational education on the labor market in Minnesota has and continues to moye through several stages of refinement with the goal of improving accuracy and interpretation. The importance of this goal is based on the assumed value of understanding the likely future relation between vocational education and the labor market on decisions made about current practice. This report provides a point-in-time description of the procedure used to produce the above information -- that is for the FY 1980 State Plan for Vocational-Technical Education.

As noted, the procedure must change if the infomation is yet to be made even better. The last chapter has presented a series of recommendations concerning changes thought to be important based on several years of experience in trying to understand the planning process as it relates to vocational education and the identification and providing of data useful to the planning process as was noted in Chapter I. Some of the changes involve further research and development; others require decisions by those responsible for determining the process to be used in preparing the State Plan.

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Appendix I

MINNESOTA SECONDARY SCHOOL FOLLOW-UP SYSTEM STUDENT QUESTIONNAIRE

MRDC-1

HIGH SCHOOL FOLLOW-UP QUESTIONNAIRE

STUDENT ☐☐☐ SCHOOL ☐☐☐☐

PLEASE COMPLETE AND RETURN THE FORM BELOW.

1. Name: _____ (Last) _____ (First) _____ (Middle Initial) (_____ Maiden)

2. Present Address: _____

_____ Phone: _____

3. Recent History: For each time period (column) in the YEAR FOLLOWING HIGH SCHOOL, check (√) the activities in which you were involved. Check at *least* one activity for each column. Note that you may respond to *both* the employment and education sections. Mark as many as apply to you.

Time Periods After Leaving High School

Activity	Sept. thru Nov.	Dec. thru Feb.	Present (Complete even if same Activity as other time period)	Planned Activity (Next Oct.)
Education (Check all that apply):				
3.1 Vocational School	( )	( )	( )	( )
3.2 Community College	( )	( )	( )	( )
3.3 College or University	( )	( )	( ) → If you marked here, *complete* #5 below.	( )
3.4 Apprenticeship	( )	( )	( )	( )
3.5 Other Education _____ (Specify)	( )	( )	( )	( )
Employment (Check all that apply):				
3.6 Unemployed (looking for work)	( )	( )	( )	( )
3.7 Homemaker (full or part time)	( )	( )	( )	( )
3.8 Military (full time)	( )	( )	( )	( )
3.9 Paid Employment	( )	( )	( ) → If you marked here, *complete* #4 below.	( )
Other Activity: (For example: ill, vacation, etc.)				
3.10 _____ (Specify)	( )	( )	( )	( )

4. Present Paid Employment Activity

4.1 Hours Per Week You Work:

1. Less than 30 ( )
2. 30 or more ( )

4.2 Job Title: _____

4.3 Job Duties: _____

_____

4.4 Relatedness To Your High School Vocational Training: My present job is: (Mark only one)

☐ 1 Closely Related ☐ 2 Somewhat Related ☐ 3 Not Related

4.5 Months On This Job Since Leaving High School: _____

4.6 Employer: _____

_____ (Company or business name. If self-employed, write 'self'.)

4.7 Employer's Address: _____ (Street)

_____ (City) (State) (Zip)

4.8 Kind of Business: _____ (For example: Farming, Retail, Shoe Store)

The following items are useful to us, but may be omitted if you prefer.

4.9 Supervisor's Name: _____

Please Mark Your Present Hourly Income:

4.10

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
Under $1.50	$1.51 to $1.99	$2.00 to $2.99	$3.00 to $3.99	$4.00 to $4.99	$5.00 or More

5. Present Education Activity

5.1 Hours Per Week You Attend:

1. 1 to 12 ( )
2. 13 to 18 ( )
3. 19 or more ( )

5.2 School Name: _____

5.3 School Address: _____

_____

5.4 Major Area of Program: _____ (For example: Auto Mechanic, Elementary Teaching)

5.5 Intended occupation after completing education: _____ (For example: Legal Secretary, Carpenter, Teacher, Undecided, etc.)

THANK YOU FOR YOUR HELP

PLEASE PLACE YOUR COMPLETED QUESTIONNAIRE IN THE RETURN MAIL TODAY.

********* NO POSTAGE REQUIRED **********

(P-692A)

Appendix II
U.S. CENSUS OF POPULATION OCCUPATIONAL CLASSIFICATION SYSTEM

OCCUPATIONAL CLASSIFICATION SYSTEM

Equivalent numeric codes follow the alphabetic codes. Either code may be utilized, depending on the processing method. "N.e.c." means "not elsewhere classified."

Occupation Code	PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS
001	Accountants
002	Architects
	Computer specialists
003	Computer programmers
004	Computer systems analysts
005	Computer specialists, n.e.c.
	Engineers
006	Aeronautical and astronautical engineers
010	Chemical engineers
011	Civil engineers
012	Electrical and electronic engineers
013	Industrial engineers
014	Mechanical engineers
015	Metallurgical and materials engineers
020	Mining engineers
021	Petroleum engineers
022	Sales engineers
023	Engineers, n.e.c.
024	Farm management advisors
025	Foresters and conservationists
026	Home management advisors
	Lawyers and judges
030	Judges
031	Lawyers
	Librarians, archivists, and curators
032	Librarians
033	Archivists and curators
	Mathematical specialists
034	Actuaries
035	Mathematicians
036	Statisticians
	Life and physical scientists
042	Agricultural scientists
043	Atmospheric and space scientists
044	Biological scientists
045	Chemists
051	Geologists
052	Marine scientists
053	Physicists and astronomers
054	Life and physical scientists, n.e.c.
055	Operations and systems researchers and analysts
060	Personnel and labor relations workers
	Physicians, dentists, and related practitioners
061	Chiropractors
062	Dentists
063	Optometrists
064	Pharmacists
065	Physicians, medical and osteopathic
071	Podiatrists
072	Veterinarians
073	Health practitioners, n.e.c.

Occupation Code	PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS—Continued
	Nurses, dietitians, and therapists
074	Dietitians
075	Registered nurses
076	Therapists
	Health technologists and technicians
080	Clinical laboratory technologists and technicians
081	Dental hygienists
082	Health record technologists and technicians
083	Radiologic technologists and technicians
084	Therapy assistants
085	Health technologists and technicians, n.e.c.
	Religious workers
086	Clergymen
090	Religious workers, n.e.c.
	Social scientists
091	Economists
092	Political scientists
093	Psychologists
094	Sociologists
095	Urban and regional planners
096	Social scientists, n.e.c.
	Social and recreation workers
100	Social workers
101	Recreation workers
	Teachers, college and university
102	Agriculture teachers
103	Atmospheric, earth, marine, and space teachers
104	Biology teachers
105	Chemistry teachers
110	Physics teachers
111	Engineering teachers
112	Mathematics teachers
113	Health specialties teachers
114	Psychology teachers
115	Business and commerce teachers
116	Economics teachers
120	History teachers
121	Sociology teachers
122	Social science teachers, n.e.c.
123	Art, drama, and music teachers
124	Coaches and physical education teachers
125	Education teachers
126	English teachers
130	Foreign language teachers
131	Home economics teachers
132	Law teachers
133	Theology teachers
134	Trade, industrial, and technical teachers
135	Miscellaneous teachers, college and university
140	Teachers, college and university, subject not specified

Occupation Code	PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS—Continued
	Teachers, except college and university
141	Adult education teachers
N (142)	Elementary school teachers
143	Prekindergarten and kindergarten teachers
144	Secondary school teachers
145	Teachers, except college and university, n.e.c.
	Engineering and science technicians
150	Agricultural and biological technicians, except health
151	Chemical technicians
152	Draftsmen
153	Electrical and electronic engineering technicians
154	Industrial engineering technicians
155	Mechanical engineering technicians
156	Mathematical technicians
161	Surveyors
162	Engineering and science technicians, n.e.c.
	Technicians, except health, and engineering and science
163	Airplane pilots
164	Air traffic controllers
165	Embalmers
170	Flight engineers
171	Radio operators
172	Tool programmers, numerical control
173	Technicians, n.e.c.
174	Vocational and educational counselors
	Writers, artists, and entertainers
175	Actors
180	Athletes and kindred workers
181	Authors
182	Dancers
183	Designers
184	Editors and reporters
185	Musicians and composers
190	Painters and sculptors
191	Photographers
192	Public relations men and publicity writers
193	Radio and television announcers
194	Writers, artists, and entertainers, n.e.c.
195	Research workers, not specified
	MANAGERS AND ADMINISTRATORS, EXCEPT FARM
201	Assessors, controllers, and treasurers; local public administration
202	Bank officers and financial managers
203	Buyers and shippers, farm products
205	Buyers, wholesale and retail trade
210	Credit men
211	Funeral directors
212	Health administrators
213	Construction inspectors, public administration
215	Inspectors, except construction, public administration
216	Managers and superintendents, building
220	Officers, managers, n.e.c.
221	Officers, pilots, and pursers; ship
222	Officials and administrators; public administration, n.e.c.
223	Officials of lodges, societies, and unions
224	Postmasters and mail superintendents
225	Purchasing agents and buyers, n.e.c.
226	Railroad conductors

Occupation Code	MANAGERS AND ADMINISTRATORS, EXCEPT FARM—Continued
230	Restaurant, cafeteria, and bar managers
231	Sales managers and department heads, retail trade
233	Sales managers, except retail trade
235	School administrators, college
240	School administrators, elementary and secondary
245	Managers and administrators, n.e.c.
	SALES WORKERS
260	Advertising agents and salesmen
261	Auctioneers
262	Demonstrators
264	Hucksters and peddlers
265	Insurance agents, brokers, and underwriters
266	Newsboys
270	Real estate agents and brokers
271	Stock and bond salesmen
280	Salesmen and sales clerks, n.e.c.[1]
	CLERICAL AND KINDRED WORKERS
301	Bank tellers
303	Billing clerks
P (305)	Bookkeepers
310	Cashiers
311	Clerical assistants, social welfare
312	Clerical supervisors, n.e.c.
313	Collectors, bill and account
314	Counter clerks, except food
315	Dispatchers and starters, vehicle
320	Enumerators and interviewers
321	Estimators and investigators, n.e.c.
323	Expediters and production controllers
325	File clerks
326	Insurance adjusters, examiners, and investigators
330	Library attendants and assistants
331	Mail carriers, post office
332	Mail handlers, except post office
333	Messengers and office boys
334	Meter readers, utilities
	Office machine operators
341	Bookkeeping and billing machine operators
342	Calculating machine operators
343	Computer and peripheral equipment operators
344	Duplicating machine operators

[1] Category "280 Salesmen and sales clerks, n.e.c." was subdivided in the Census into 5 occupation groups dependent on industry. The industry codes are shown in parentheses.

Occ. Code	
281	Sales representatives, manufacturing industries (Ind. 107-399)
282	Sales representatives, wholesale trade (Ind. 017-058, 507-599)
283	Sales clerks, retail trade (Ind. 608-699 except 618, 639, 649, 667, 668, 688)
284	Salesmen, retail trade (Ind. 607, 618, 639, 649, 667, 668, 688)
285	Salesmen of services and construction (Ind. 067-078, 407-499, 707-947)

Occupation Code	CLERICAL AND KINDRED WORKERS—Continued
	Office machine operators—Continued
345	Key punch operators
350	Tabulating machine operators
355	Office machine operators, n.e.c.
360	Payroll and timekeeping clerks
361	Postal clerks
362	Proofreaders
363	Real estate appraisers
364	Receptionists
	Secretaries
370	Secretaries, legal
371	Secretaries, medical
Q (372)	Secretaries, n.e.c.
374	Shipping and receiving clerks
375	Statistical clerks
376	Stenographers
381	Stock clerks and storekeepers
382	Teacher aides, exc. school monitors
383	Telegraph messengers
384	Telegraph operators
385	Telephone operators
390	Ticket, station, and express agents
391	Typists
392	Weighers
394	Miscellaneous clerical workers
395	Not specified clerical workers

CRAFTSMEN AND KINDRED WORKERS

401	Automobile accessories installers
402	Bakers
403	Blacksmiths
404	Boilermakers
405	Bookbinders
410	Brickmasons and stonemasons
411	Brickmasons and stonemasons, apprentices
412	Bulldozer operators
413	Cabinetmakers
R (415)	Carpenters
417	Carpenter apprentices
420	Carpet installers
421	Cement and concrete finishers
422	Compositors and typesetters
423	Printing trades apprentices, exc. pressmen
424	Cranemen, derrickmen, and hoistmen
425	Decorators and window dressers
426	Dental laboratory technicians
430	Electricians
431	Electrician apprentices
433	Electric power linemen and cablemen
434	Electrotypers and stereotypers
435	Engravers, exc. photoengravers
436	Excavating, grading, and road machine operators; exc. bulldozer
440	Floor layers, exc. tile setters
441	Foremen, n.e.c.
442	Forgemen and hammermen
443	Furniture and wood finishers
444	Furriers
445	Glaziers
446	Heat treaters, annealers, and temperers
450	Inspectors, scalers, and graders; log and lumber
452	Inspectors, n.e.c.

Occupation Code	CRAFTSMEN AND KINDRED WORKERS—Continued
453	Jewelers and watchmakers
454	Job and die setters, metal
455	Locomotive engineers
456	Locomotive firemen
461	Machinists
462	Machinist apprentices
	Mechanics and repairmen
470	Air conditioning, heating, and refrigeration
471	Aircraft
472	Automobile body repairmen
S (473)	Automobile mechanics
474	Automobile mechanic apprentices
475	Data processing machine repairmen
480	Farm implement
481	Heavy equipment mechanics, incl. diesel
482	Household appliance and accessory installers and mechanics
483	Loom fixers
484	Office machine
485	Radio and television
486	Railroad and car shop
491	Mechanic, exc. auto, apprentices
492	Miscellaneous mechanics and repairmen
495	Not specified mechanics and repairmen
501	Millers; grain, flour, and feed
502	Millwrights
503	Molders, metal
504	Molder apprentices
505	Motion picture projectionists
506	Opticians, and lens grinders and polishers
510	Painters, construction and maintenance
511	Painter apprentices
512	Paperhangers
514	Pattern and model makers, exc. paper
515	Photoengravers and lithographers
516	Piano and organ tuners and repairmen
520	Plasterers
521	Plasterer apprentices
522	Plumbers and pipe fitters
523	Plumber and pipe fitter apprentices
525	Power station operators
530	Pressmen and plate printers, printing
531	Pressman apprentices
533	Rollers and finishers, metal
534	Roofers and slaters
535	Sheetmetal workers and tinsmiths
536	Sheetmetal apprentices
540	Shipfitters
542	Shoe repairmen
543	Sign painters and letterers
545	Stationary engineers
546	Stone cutters and stone carvers
550	Structural metal craftsmen
551	Tailors
552	Telephone installers and repairmen
554	Telephone linemen and splicers
560	Tile setters
561	Tool and die makers
562	Tool and die maker apprentices
563	Upholsterers
571	Specified craft apprentices, n.e.c.
572	Not specified apprentices

Occupation Code	CRAFTSMEN AND KINDRED WORKERS—Continued
575	Craftsmen and kindred workers, n.e.c.
580	Former members of the Armed Forces

OPERATIVES, EXCEPT TRANSPORT

601	Asbestos and insulation workers
T (602)	Assemblers
603	Blasters and powdermen
604	Bottling and canning operatives
605	Chainmen, rodmen, and axmen; surveying
610	Checkers, examiners, and inspectors; manufacturing
611	Clothing ironers and pressers
612	Cutting operatives, n.e.c.
613	Dressmakers and seamstresses, except factory
614	Drillers, earth
615	Dry wall installers and lathers
620	Dyers
621	Filers, polishers, sanders, and buffers
622	Furnacemen, smeltermen, and pourers
623	Garage workers and gas station attendants
624	Graders and sorters, manufacturing
625	Produce graders and packers, except factory and farm
626	Heaters, metal
630	Laundry and dry cleaning operatives, n.e.c.
631	Meat cutters and butchers, exc. manufacturing
633	Meat cutters and butchers, manufacturing
634	Meat wrappers, retail trade
635	Metal platers
636	Milliners
640	Mine operatives, n.e.c.
641	Mixing operatives
642	Oilers and greasers, exc. auto
643	Packers and wrappers, except meat and produce
644	Painters, manufactured articles
645	Photographic process workers
	Precision machine operatives
650	Drill press operatives
651	Grinding machine operatives
652	Lathe and milling machine operatives
653	Precision machine operatives, n.e.c.
656	Punch and stamping press operatives
660	Riveters and fasteners
661	Sailors and deckhands
662	Sawyers
663	Sewers and stitchers
664	Shoemaking machine operatives
665	Solderers
666	Stationary firemen
	Textile operatives
670	Carding, lapping, and combing operatives
671	Knitters, loopers, and toppers
672	Spinners, twisters, and winders
673	Weavers
674	Textile operatives, n.e.c.
680	Welders and flame-cutters
681	Winding operatives, n.e.c.
690	Machine operatives, miscellaneous specified
692	Machine operatives, not specified
694	Miscellaneous operatives
695	Not specified operatives

Occupation Code	TRANSPORT EQUIPMENT OPERATIVES
701	Boatmen and canalmen
703	Bus drivers
704	Conductors and motormen, urban rail transit
705	Deliverymen and routemen
706	Fork lift and tow motor operatives
710	Motormen; mine, factory, logging camp, etc.
711	Parking attendants
712	Railroad brakemen
713	Railroad switchmen
714	Taxicab drivers and chauffeurs
U (715)	Truck drivers

LABORERS, EXCEPT FARM

740	Animal caretakers, exc. farm
750	Carpenters' helpers
V (751)	Construction laborers, exc. carpenters' helpers
752	Fishermen and oystermen
753	Freight and material handlers
754	Garbage collectors
755	Gardeners and groundskeepers, exc. farm
760	Longshoremen and stevedores
761	Lumbermen, raftsmen, and woodchoppers
762	Stock handlers
763	Teamsters
764	Vehicle washers and equipment cleaners
770	Warehousemen, n.e.c.
780	Miscellaneous laborers
785	Not specified laborers

FARMERS AND FARM MANAGERS

W (801)	Farmers (owners and tenants)
802	Farm managers

FARM LABORERS AND FARM FOREMEN

821	Farm foremen
822	Farm laborers, wage workers
823	Farm laborers, unpaid family workers
824	Farm service laborers, self-employed

SERVICE WORKERS, EXC. PRIVATE HOUSEHOLD

	Cleaning service workers
901	Chambermaids and maids, except private household
902	Cleaners and charwomen
X (903)	Janitors and sextons
	Food service workers
910	Bartenders
911	Busboys
912	Cooks, except private household
913	Dishwashers
914	Food counter and fountain workers
Y (915)	Waiters
916	Food service workers, n.e.c., except private household

Occupation Code	SERVICE WORKERS, EXC. PRIVATE HOUSEHOLD—Continued
	Health service workers
921	Dental assistants
922	Health aides, exc. nursing
923	Health trainees
924	Lay midwives
925	Nursing aides, orderlies, and attendants
926	Practical nurses
	Personal service workers
931	Airline stewardesses
932	Attendants, recreation and amusement
933	Attendants, personal service, n.e.c.
934	Baggage porters and bellhops
935	Barbers
940	Boarding and lodging house keepers
941	Bootblacks
942	Child care workers, exc. private household
943	Elevator operators
944	Hairdressers and cosmetologists
945	Personal service apprentices
950	Housekeepers, exc. private household
952	School monitors
953	Ushers, recreation and amusement
954	Welfare service aides
	Protective service workers
960	Crossing guards and bridge tenders
961	Firemen, fire protection
962	Guards and watchmen
963	Marshals and constables
964	Policemen and detectives
965	Sheriffs and bailiffs

Occupation Code	PRIVATE HOUSEHOLD WORKERS
980	Child care workers, private household
981	Cooks, private household
982	Housekeepers, private household
983	Laundresses, private household
Z (984)	Maids and servants, private household
995	OCCUPATION NOT REPORTED[2]
	ALLOCATION CATEGORIES[3]
196	Professional, technical, and kindred workers—allocated
246	Managers and administrators, except farm—allocated
296	Sales workers—allocated
396	Clerical and kindred workers—allocated
586	Craftsmen and kindred workers—allocated
696	Operatives, except transport—allocated
726	Transport equipment operatives—allocated
796	Laborers, except farm—allocated
806	Farmers and farm managers—allocated
846	Farm laborers and farm foremen—allocated
976	Service workers, exc. private household—allocated
986	Private household workers—allocated

[2]This code is used to identify not reported occupations in surveys where the not reported cases are not allocated.

[3]Those returns from the Population Census which do not have an occupation entry are allocated among the major occupation groups during computer processing. These cases are labeled with the code for the "allocation" category to which they are assigned. (See text, page IV).

Appendix III
CROSS CLASSIFICATION OF U.S. CENSUS OF POPULATION AND MINNESOTA DEPARTMENT OF ECONOMIC SECURITY OCCUPATIONAL TITLES

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1101	Engineers Civil	011	Civil Engineers
1102	Engineers, Electrical	012	Electrical and Electronic Engineers
1103	Engineers, Industrial	013	Industrial Engineers
1104	Engineers, Mechanical	014	Mechanical Engineers
1105	Chemists	045	Chemists
1106	Drafters	152	Draftsmen
1107	Electrical, Electronic Technicians	153	Electrical and Electronic Engineering Technicians
1108	Dentists	062	Dentists
1109	Pharmacists	064	Pharmacists
1110	Physicians, Medical, Osteopaths	065	Physicians, Medical and Osteopathic
1111	Registered Nurses	075	Registered Nurses
1112	Clinical Lab Technologists and Technicians	080	Clinical Lab Technologists and Technicians
1113	Radiologic Technologists and Technicians	083	Radiologic Technologists and Technicians
1114	Surveyors	161	Surveyors
1115	Airplane Pilots	162	Airplane Pilots
1116	Computers Programmers	003	Computer Programmers
1117	Computer Systems Analysts	004	Computer Systems Analysts
1118	Economists	091	Economists
1119	Adult Education Teachers	141	Adult Education Teachers
1120	College and University Teachers	102	Agriculture Teachers
1120	College and University Teachers	103	Atmospheric, Earth, Marine and Space Teachers
1120	College and University Teachers	104	Biology Teachers
1120	College and University Teachers	105	Chemistry Teachers
1120	College and University Teachers	110	Physics Teachers
1120	College and University Teachers	111	Engineering Teachers

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1120	College and University Teachers	112	Mathematics Teachers
1120	College and University Teachers	113	Health Specialties Teachers
1120	College and University Teachers	114	Psychology Teachers
1120	College and University Teachers	115	Business and Commerce Teachers
1120	College and University Teachers	116	Economics Teachers
1120	College and University Teachers	120	History Teachers
1120	College and University Teachers	121	Sociology Teachers
1120	College and University Teachers	122	Social Science Teachers, NEC.
1120	College and University Teachers	123	Art, Drama and Music Teachers
1120	College and University Teachers	124	Coaches and Physical Education Teachers
1120	College and University Teachers	125	Education Teachers
1120	College and University Teachers	126	English Teachers
1120	College and University Teachers	130	Foreign Language Teachers
1120	College and University Teachers	131	Home Economics Teachers
1120	College and University Teachers	132	Law Teachers
1120	College and University Teachers	133	Theology Teachers
1120	College and University Teachers	134	Trade Industrial and Technical Teachers
1120	College and University Teachers	135	Misc. Teachers, College and University
1120	College and University Teachers	140	Teachers, College and University, Subject Not Specified
1121	Elementary School Teachers	142	Elementary School Teachers
1122	Preschool and Kindergarten Teachers	143	Prekindergarten and Kindergarten Teachers
1123	Secondary School Teachers	144	Secondary School Teachers
1124	Editors and Reporters	184	Editors and Reporters
1125	Musicians and Composers	185	Musicians and Composers
1126	Photographers	191	Photographers

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1127	Painters and Sculptors	190	Painters and Sculptors
1128	Public Relations Specialists	192	Public Relations and Publicity Writers
1129	Accountants	001	Accountants
1130	Clergy	086	Clergymen
1131	Lawyers	031	Lawyers
1132	Librarians	032	Librarians
1133	Personnel, Labor Relations	056	Personnel and Labor Relations Worker
1134	Research Workers NEC.	195	Research Workers Not Specified
1135	Recreation Workers	101	Recreation Workers
1136	Social Workers	100	Social Workers
1137	Vocational and Education Counselor	174	Vocational and Educational Counselor
1138	Therapists	076	Therapists
1139	Agricultural, Biological Technical except Health	150	Agricultural and Biological Technical except Health
1140	Architects	002	Architects
1141	Other Professional, Technical	006	Aeronautical and Astronautical Engineers
1141	Other Professional, Technical	010	Chemical Engineers
1141	Other Professional, Technical	015	Metallurgical and Materials Engineers
1141	Other Professional, Technical	020	Mining Engineers
1141	Other Professional, Technical	021	Petroleum Engineers
1141	Other Professional, Technical	022	Sales Engineers
1141	Other Professional, Technical	023	Engineers NEC.
1141	Other Professional, Technical	042	Agricultural Scientists
1141	Other Professional, Technical	043	Atmospheric and Space Scientists
1141	Other Professional, Technical	044	Biological Scientists
1141	Other Professional, Technical	051	Geologists

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1141	Other Professional, Technical	052	Marine Scientists
1141	Other Professional, Technical	053	Physicists and Astronomers
1141	Other Professional, Technical	054	Life and Physical Scientists
1141	Other Professional, Technical	005	Computer Specialists NEC.
1141	Other Professional, Technical	151	Chemical Technicians
1141	Other Professional, Technical	154	Industrial Engineering Technicians
1141	Other Professional, Technical	155	Mechanical Engineering Technicians
1141	Other Professional, Technical	156	Mathematical Technicians
1141	Other Professional, Technical	162	Engineering and Science Technicians NEC.
1141	Other Professional, Technical	061	Chiropractors
1141	Other Professional, Technical	063	Optometrists
1141	Other Professional, Technical	071	Podiatrists
1141	Other Professional, Technical	072	Veterinarian
1141	Other Professional, Technical	073	Health Practitioners NEC.
1141	Other Professional, Technical	074	Dietitians
1141	Other Professional, Technical	081	Dental Hygienists
1141	Other Professional, Technical	082	Health Record Technologists and Technicians
1141	Other Professional, Technical	084	Therapy Assistants
1141	Other Professional, Technical	085	Health Technologists and Technicians NEC.
1141	Other Professional, Technical	164	Air Traffic Controllers
1141	Other Professional, Technical	165	Embalmers
1141	Other Professional, Technical	170	Flight Engineers
1141	Other Professional, Technical	171	Radio Operators
1141	Other Professional, Technical	172	Tool Programmers Numerical Control
1141	Other Professional, Technical	173	Technicians, NEC.

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1141	Other Professional, Technical	092	Political Scientists
1141	Other Professional, Technical	093	Psychologists
1141	Other Professional, Technical	094	Sociologists
1141	Other Professional, Technical	095	Urban and Regional Planners
1141	Other Professional, Technical	096	Social Scientists, NEC.
1141	Other Professional, Technical	145	Teachers except College and University, NEC.
1141	Other Professional, Technical	183	Designers
1141	Other Professional, Technical	185	Actors
1141	Other Professional, Technical	180	Athletes and Kindred Workers
1141	Other Professional, Technical	181	Authors
1141	Other Professional, Technical	182	Dancers
1141	Other Professional, Technical	193	Radio and Television Announcers
1141	Other Professional, Technical	194	Writers, Artists and Entertainers, NEC.
1141	Other Professional, Technical	033	Archivists and Curators
1141	Other Professional, Technical	030	Judges
1141	Other Professional, Technical	024	Farm Management Advisors
1141	Other Professional, Technical	025	Foresters and Conservationists
1141	Other Professional, Technical	026	Home Management Advisors
1141	Other Professional, Technical	034	Actuaries
1141	Other Professional, Technical	035	Mathematicians
1141	Other Professional, Technical	036	Statisticians
1141	Other Professional, Technical	055	Operations and Systems Researchers and Analysts
1141	Other Professional, Technical	090	Religious Workers, NEC.
1201	Bank, Financial Managers	202	Bank Officers and Financial Managers
1202	Buyers, Wholesale and Retail	205	Buyers, Wholesale and Retail Trade

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1305	Other Sales Workers	260	Advertising Agents and Salesmen
1305	Other Sales Workers	261	Auctioneers
1305	Other Sales Workers	262	Demonstraters
1305	Other Sales Workers	266	Newsboys
1305	Other Sales Workers	280	Salesmen and Sales, NEC.
1401	Secretaries, Legal	370	Secretaries, Legal
1402	Secretaries, Medical	371	Secretaries, Medical
1403	Secretaries, General	372	Secretaries, NEC.
1404	Stenographers	376	Stenographers
1405	Bookkeeping, Billing Machine tors	341	Bookkeeping and Billing Machine Operators
1406	Typists	391	Typists
1407	Computer, Peripheral Equipment Operators	343	Computer and Peripheral Equipment Operators
1408	Key Punch Operators	345	Key Punch Operators
1409	Bank Tellers	301	Bank Tellers
1410	Cashiers	310	Cashiers
1411	Billing Clerks	303	Billing Clerks
1412	Bookkeepers	305	Bookkeepers
1413	Counter Clerks, except Food	314	Counter Clerks, except Food
1414	Estimators, Investigators, NEC.	321	Estimators and Investigators, NEC.
1415	Expeditors, Production Controllers	323	Expeditors and Production Controller
1416	File Clerks	325	File Clerks
1417	Insurance Adjuster, Examiners	326	Insurance Adjusters, Examiners, Investigators
1418	Library Attendants, Assistants	330	Library Attendants and Assistants
1419	Mail Carriers, Post Office	331	Mail Carriers Post Office
1420	Postal Clerks	361	Postal Clerks
1421	Mail Handlers, Except Post Office	332	Mail Handlers Except Post Office

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY
MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1429	Other Clerical Workers	344	Duplicating Machine Operators
1501	Carpenter	415	Carpenters
1502	Brick and Stone Masons	410	Brickmasons and Stonemasons
1503	Bulldozer Operators	412	Bulldozer Operators
1504	Electrician	430	Electricians
1505	Excavating, Grading Machine Operators	436	Excavating, Grading, Road Machine Operators exc. Bulldozers
1506	Painters	510	Painters, Construction and Maintenance
1507	Plumbers	522	Plumbers and Pipe Fitters
1508	Blue Collar Worker Supervisor	441	Foreman, NEC.
1509	Machinists	461	Machinists
1510	Sheetmetal Workers	535	Sheetmetal Workers and Tinsmiths
1511	Tool and Die Makers	561	Tool and Die Makers
1512	Air Cond., Heating Refrig. Mechanic	470	Air Conditioning, Heating and Refrig.
1513	Aircraft Mechanic	471	Aircraft Mechanic
1514	Auto Body Repairers	472	Automobile Body Repairmen
1515	Auto Mechanics	473	Automobile Mechanics
1516	Farm Implement Mechanic	480	Farm Implement Mechanic
1517	Heavy Equipment Mechanic	481	Heavy Equipment Mechanic Including Diesel
1518	Household Appliance Mechanic	482	Household Appliances Appl. Acces. Installer, Mechanic
1519	Radio, Television Repairers	485	Radio and Television Repairer
1520	Railroad and Car Shop Mechanic	486	Railroad and Car Shop Mechanic
1521	Compositors, Typesetters	422	Compositers and Typesetters
1522	Printing Press Operators	530	Pressmen Plate Printers, Printing
1523	Electric Power Line Installers, Repairs	433	Electric Power Lineman and Cablemen
1525	Telephone Installers, Repairers	552	Telephone Installers and Repairmen
1525	Bakers	402	Bakers

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1422	Payroll, Timekeeping Clerks	360	Payroll and Timekeeping Clerks
1423	Receptionists	364	Receptionists
1424	Shipping, Receiving Clerks	374	Shipping and Receiving Clerks
1425	Statistical Clerks	375	Statistical Clerks
1426	Stock Clerks, Storekeepers	381	Stock Clerks and Storekeepers
1427	Telephone Operators	385	Telephone Operators
1428	Clerical Supervisors	312	Clerical Supervisors, NEC.
1429	Other Clerical Workers	350	Tabulating Machine Operators
1429	Other Clerical Workers	355	Office Machine Operators, NEC.
1429	Other Clerical Workers	320	Enumerators and Interviewers
1429	Other Clerical Workers	382	Teacher Aides Except School Monitors
1429	Other Clerical Workers	390	Ticket Station and Express Agents
1429	Other Clerical Workers	311	Clerical Assistants Social Welfare
1429	Other Clerical Workers	313	Collectors, Bill and Account
1429	Other Clerical Workers	315	Dispatchers and Starters, Vehicle
1429	Other Clerical Workers	333	Messengers and Office Boys
1429	Other Clerical Workers	334	Meter Readers, Utilities
1429	Other Clerical Workers	362	Proofreaders
1429	Other Clerical Workers	363	Real Estate Appraisers
1429	Other Clerical Workers	383	Telegraph Messengers
1429	Other Clerical Workers	384	Telegraph Operators
1429	Other Clerical Workers	392	Weighers
1429	Other Clerical Workers	394	Miscellaneous Clerical Workers
1429	Other Clerical Workers	395	Not Specified Clerical Workers
1429	Other Clerical Workers	342	Calculating Machine Operators

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY
MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1203	Purchasing Agents and Buyers	225	Purchasing Agents and Buyers, NEC.
1204	Sales Manager	231	Sales Managers and Department Heads, Retail Trade
1204	Sales Manager	233	Sales Managers, except Retail Trade
1205	Inspectors, except Construction, Publi:	215	Inspectors, except Construction and Public Administrator
1206	Health Administrators	212	Health Administrators
1207	Managers, Superintendents, Building	216	Managers and Superintendetns, Building
1208	Officials of Lodges, Unions	223	Officials of Lodges, Societies and Unions
1209	Office Managers, NEC.	220	Office Managers, NEC.
1210	Officials and Administrators, Public	222	Officials and Administrators, Public Administrators
1211	School Administrators	235	School Administrators, College
1211	School Administrators	240	School Administrators, Elementary and Secondary
1212	Restaurant, Cafe and Bar Managers	230	Restaurant, Cafeteria and Bar Managers
1213	Credit Managers	210	Credit Men
1214	Other Managers, Officials, Proprietors	213	Construction Inspectors, Public Administrators
1214	Other Managers, Officials, Proprietors	201	Assessor, Controller, Treasurer, Local Public Administrator
1214	Other Managers, Officials, Proprietors	203	Buyers and Shippers, Farm Products
1214	Other Managers, Officials, Proprietors	211	Funeral Directors
1214	Other Managers, Officials, Proprietors	221	Officers, Pilots and Pursers, Ship
1214	Other Managers, Officials, Proprietors	224	Postmasters and Mail Superintendents
1214	Other Managers, Officials, Proprietors	226	Railroad Conductors
1214	Other Managers, Officials, Proprietors	245	Managers and Administrators, NEC.
1301	Hucksters and Peddlers	264	Hucksters and Peddlers
1302	Insurance Agents, Brokers	265	Insurance Agents, Brokers and Underwriters
1303	Real Estate Agents, Brokers	270	Real Estate Agents and Brokers
1304	Stock and Bond Agents	271	Stock and Bond Salesmen

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1526	Cabinetmakers	413	Cabinetmakers
1527	Crane, Derrick, and Hoist Operators	424	Cranemen Derrickmen and Hoistmen
1528	Structural Metal Craft Workers	550	Structural Metal Craftsmen
1529	Stationary Engineers	545	Stationary Engineers
1530	Millwrights	502	Millwrights
1531	Data Processing Machine Repairers	475	Data Procedding Machine Repairmen
1532	Carpet Installers	420	Carpet Installers
1533	Opticians, Lens Grinders	506	Opticians, Lens Grinder, Polishers
1534	Other Craft Workers	411	Brickmasons and Stonemasons Apprentices
1534	Other Craft Workers	416	Carpenter Apprentices
1534	Other Craft Workers	421	Cement and Concrete Finishers
1534	Other Craft Workers	431	Electricians Apprentices
1534	Other Craft Workers	440	Floor Layers Except Tile Setters
1534	Other Craft Workers	511	Painter Apprentices
1534	Other Craft Workers	512	Paperhangers
1534	Other Craft Workers	520	Plasterers
1534	Other Craft Workers	523	Plumber and Pipe Fitter Apprentices
1534	Other Craft Workers	534	Roofers and Slaters
1534	Other Craft Workers	560	Tile Setters
1534	Other Craft Workers	403	Blacksmiths
1534	Other Craft Workers	404	Boilermakers
1534	Other Craft Workers	442	Forgemen and Hammermen
1534	Other Craft Workers	446	Heat Treaters Annealers and Temperer
1534	Other Craft Workers	454	Job and Die Setters, Metal
1534	Other Craft Workers	462	Machinist Apprentices

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1534	Other Craft Workers	503	Molders, Metal
1534	Other Craft Workers	514	Pattern, Model Makers Except Paper
1534	Other Craft Workers	533	Rollers and Finishers, Metal
1534	Other Craft Workers	536	Sheetmetal Apprentices
1534	Other Craft Workers	562	Tool and Die Maker Apprentices
1534	Other Craft Workers	401	Auto Accessory Installers
1534	Other Craft Workers	474	Automobile Mechanic Apprentices
1534	Other Craft Workers	483	Loom Fixers
1534	Other Craft Workers	484	Office Machine Mechanic
1534	Other Craft Workers	491	Mechanic, Except Auto Apprentices
1534	Other Craft Workers	492	Miscellaneous Mechanics and Repairmen
1534	Other Craft Workers	495	Not Specified Mechanics and Repairmen
1534	Other Craft Workers	405	Bookbinders
1534	Other Craft Workers	423	Printing Trades Appr., Except Pressmen
1534	Other Craft Workers	434	Electrotypers and Stereotypers
1534	Other Craft Workers	435	Engravers Except Photoengravers
1534	Other Craft Workers	515	Photoengravers and Lithographers
1534	Other Craft Workers	531	Pressmen Apprentices
1534	Other Craft Workers	455	Locmotive Engineers
1534	Other Craft Workers	456	Locomotive Firemen
1534	Other Craft Workers	525	Power Station Operators
1534	Other Craft Workers	554	Telephone Linemen and Splicers
1534	Other Craft Workers	450	Inspectors Scalers Graders; Log, Lbr.
1534	Other Craft Workers	452	Inspectors, NEC.
1534	Other Craft Workers	425	Decorator and Window Dressers

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1534	Other Craft Workers	426	Dental Laboratory Technicians
1534	Other Craft Workers	443	Furniture and Wood Finishers
1534	Other Craft Workers	444	Furriers
1534	Other Craft Workers	445	Glaziers
1534	Other Craft Workers	453	Jewelers and Watchmakers
1534	Other Craft Workers	501	Millers, Grain Flour and Feed
1534	Other Craft Workers	504	Molder Apprentices
1534	Other Craft Workers	505	Motion Picture Projectionists
1534	Other Craft Workers	516	Piano, Organ Tuners and Repairmen
1534	Other Craft Workers	521	Plasterer Apprentices
1534	Other Craft Workers	540	Shipfitters
1534	Other Craft Workers	542	Shoe Repairmen
1534	Other Craft Workers	543	Sign Painters and Letterers
1534	Other Craft Workers	546	Stone Cutters and Stone
1534	Other Craft Workers	563	Upholsterers
1534	Other Craft Workers	571	Specified Craft Apprentices
1534	Other Craft Workers	572	Not Specified Apprentices
1534	Other Craft Workers	575	Craftsmen and Kindred Workers, NEC.
1534	Other Craft Workers	580	Former Members of the Armed Forces
1534	Other Craft Workers	551	Tailors
1601	Drill Press Operators	650	Drill Press Operatives
1602	Grinding Machine Operators	651	Grinding Machines Operatives
1603	Lathe, Milling Machine Operators	652	Lathe and Milling Machine Operatives
1604	Punch Stamping Press Operators	656	Punch and Stamping Press Operatives
1605	Welders, Flamecutters	680	Welders and Flame - Cutters
1606	Checkers, Examiners, Mfg.	610	Checkers, Examiners, Inspectors, Mfg.

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1607	Packer, Wrapper, Except Meat Product	643	Packers & Wrappers Except Meat Product
1608	Assembler	602	Assemblers
1609	Clothing Ironers, Pressers	611	Clothing Ironers & Pressers
1610	Bottling, Canning Operators	604	Bottling & Canning Operatives
1611	Dressmaker, except Factory	613	Dressmaker, Seamstresses, Except Factory
1612	Filers, Polisher, Sanders, Buffers	621	Filers, Polishers, Sanders and Buffers
1613	Garage Workers, Gas Station Attendants	623	Garage Workers, Gas Station Attendants
1614	Meat Cutters, Butchers, Except Mfg.	631	Meat Cutter and Butchers, Exc. Mfg.
1615	Meat Cutters, Butchers, Mfg.	633	Meat Cutter and Butchers, Mfg.
1616	Sawyers	662	Sawyers
1617	Sewers, Stitchers	663	Sewers and Stitchers
1618	Bus Drivers	703	Bus Drivers
1619	Delivery and Route Workers	705	Deliverymean and Routemen
1620	Fork lift, Two Motor Operators	706	Fork lifts and Tow Motor Operatives
1621	Railroad Switch Operators	713	Railroad Switchmen
1622	Taxicab Drivers, Chauffeurs	714	Taxicab Drivers and Chauffeurs
1623	Truck Drivers	715	Truck Drivers
1624	Painters, Mfg. Articles	644	Painters, Mfg. Articles
1625	Cutting Operatives, NEC	512	Cutting Operatives, NEC
1626	Laundry, Dry Clean Oprs., NEC	630	Laundry Dry Cleaning Operatives, NEC
1627	Photographic Process Workers	645	Photographic Process Workers
1628	Winding Operatives	681	Winding Operatives, NEC
1629	Misc. Machine Operatives	690	Machine Operatives, Misc. Specified
1630	Other Operatives	653	Precision Machine Operatives
1630	Other Operatives	701	Boatmen and Canalmen
1630	Other Operatives	704	Conductors, Motormen, Urban Rail Transit

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1630	Other Operatives	710	Motormen: Mine Factory Logging Camp, etc.
1630	Other Operatives	711	Parking Attendants
1630	Other Operatives	712	Railroad Brakemen
1630	Other Operatives	640	Mine Operatives, NEC
1630	Other Operatives	601	Asbestos and Insulation Workers
1630	Other Operatives	603	Blasters and Powdermen
1630	Other Operatives	605	Chainmen Rodmen and Axmen, Surveying
1630	Other Operatives	614	Drillers, Earth
1630	Other Operatives	615	Dry Wall Installers and Lathers
1630	Other Operatives	620	Dyers
1630	Other Operatives	622	Furnacemen, Smeltermen and Pourers
1630	Other Operatives	624	Graders and Sorters, Mfg.
1630	Other Operatives	625	Prod. Graders, Packers, Exc. Factory, Farm
1630	Other Operatives	626	Heaters, Metal
1630	Other Operatives	634	Meat Wrappers, Retail Trades
1630	Other Operatives	635	Metal Platers
1630	Other Operatives	636	Milliners
1630	Other Operatives	641	Mixing Operatives
1630	Other Operatives	642	Oilers and Greasers, Exc. Auto
1630	Other Operatives	660	Riveters and Fasteners
1630	Other Operatives	661	Sailors and Deckhands
1630	Other Operatives	664	Shoemaking Machine Operatives
1630	Other Operatives	665	Solderers
1630	Other Operatives	666	Stationary Firemen
1630	Other Operatives	670	Carding Lapping Combing Operatives
1630	Other Operatives	671	Knitters, Loopers and Toppers

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1630	Other Operatives	672	Spinners, Twister and Winders
1630	Other Operatives	673	Weavers
1630	Other Operatives	674	Textile Operatives, NEC
1630	Other Operatives	692	Machine Operatives, Not Specified
1630	Other Operatives	694	Misc. Operatives
1630	Other Operatives	685	Not Specified Operatives
1701	Lodging Quarters Cleaners	901	Chambermaids, Exc. Private Hshd.
1702	Bldg. Interior Cleaners	902	Cleaners and Charwomen
1703	Janitors and Sextons	903	Janitors and Sextons
1704	Bartenders	910	Bartenders
1705	Waiters Assitants	911	Busboys
1706	Cooks except private	912	Cooks except private household
1707	Dishwashers	913	Dishwashers
1708	Food Counter, Fountain Workers	914	Food Counter and Fountain Workers
1709	Waiters	915	Waiters
1710	Dental Assistants	921	Dental Assistants
1711	Health Aides, Except Nursing	922	Health Aides, Except Nursing
1712	Nurses Aides, Orderlies	925	Nursing Aides, Orderlies and Attendants
1713	Practical Nurses	926	Practical Nurses
1714	Barbers	935	Barbers
1715	Child Care Workers, Exc. Priv. Hshd.	942	Child Care Workers, Except Private Households
1716	Hairdressers, Cosmetologists	944	Hairdressers and Cosmetologists
1717	Housekeepers, Exc. Priv. Hshd.	950	Housekeepers, Exc. Private Households
1718	Firefighters	961	Firemen, Fire Protection
1719	Police and Detectives	964	Policemen and Detectives
1720	Guards	962	Guards and Watchmen

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1721	Child Care Workers, Private Hshd.	980	Child Care Workers, Private Household
1722	Private Household Cleaners	984	Maids and Servants, Private Household
1723	Flight Attendants	931	Airline Stewardesses
1724	Attendants, Recr., and Amuse.	932	Attendants, Recreation and Amusement
1725	Other Service Workers	916	Food Service Workers, Exc. Priv. Hhold.
1725	Other Service Workers	923	Health Trainees
1725	Other Service Workers	924	Lay Midwives
1725	Other Service Workers	933	Attendants, Personal Service, NEC
1725	Other Service Workers	934	Baggage Porters and Bellhops
1725	Other Service Workers	940	Boarding, Lodging Housekeepers
1725	Other Service Workers	941	Bootblacks
1725	Other Service Workers	943	Elevator Operators
1725	Other Service Workers	945	Personal Service Apprentices
1725	Other Service Workers	952	School Monitors
1725	Other Service Workers	953	Ushers, Recreation and Amusement
1725	Other Service Workers	954	Welfare Service Aides
1725	Other Service Workers	960	Crossing Guards and Bridge Tenders
1725	Other Service Workers	963	Marshalls and Constables
1725	Other Service Workers	965	Sheriffs and Bailiffs
1725	Other Service Workers	981	Cooks, Private Household
1725	Other Service Workers	982	Housekeepers, Private Household
1725	Other Service Workers	983	Laundresses, Private Household
1801	Carpenter Helpers	750	Carpenters Helpers
1802	Constr. Labor., Exc. Carpenter	751	Constr. Laborers Exc. Optrs. Helpers
1803	Freight Material Handlers	753	Freight and Material Handlers
1804	Gardeners, Groundkeepers, Exc. Farm	755	Gardeners, Groundskeepers, Exc. Farm

CROSS CLASSIFICATION OF ASSIGNED CODES AND TITLES FOR OCCUPATIONS AS REPORTED BY MINNESOTA DEPARTMENT OF EMPLOYMENT SERVICES AND U.S. BUREAU OF CENSUS OCCUPATION CODES AND TITLES

Minnesota Department of Employment Services Occupations		U.S. Bureau of Census Occupations	
Code	Occupation Title	Code	Occupation Title
1805	Timber Cutting, Logging Workers	761	Lumbermen, Raftsmen and Woodchoppers
1806	Stock Handlers	762	Stock Handlers
1807	Vehicle Washer, Equip, Cleaner	764	Vehicle Washers, Equip. Cleaners
1808	Warehouse Workers, NEC	770	Warehousemen, NEC
1809	Garbage Collectors	754	Garbage Collectors
1810	Other Laborers	740	Animal Caretakers, Exc. Farm
1810	Other Laborers	752	Fishermen and Oystermen
1810	Other Laborers	760	Longshoremen and Stevedores
1810	Other Laborers	763	Teamsters
1810	Other Laborers	780	Misc. Laborers
1810	Other Laborers	785	Not Specified Laborers
1901	Farmers (owners and tenants)	801	Farmers (owners and tenants)
1902	Farm Managers	802	Farm Managers
1903	Farm Laborers, Wage Workers	822	Farm Laborers, Wage Workers
1904	Farm Laborers, Unpaid Family	823	Farm Laborers, Unpaid Family Workers
1905	Other Farmers and Farm Laborers	821	Farm Foremen
1905	Other Farmers and Farm Laborers	824	Farm Service Laborers, Self-Employed

Appendix IV
MINNESOTA VOCATIONAL FOLLOW-UP SYSTEM STUDENT QUESTIONNAIRE

Form N 3977

Minnesota Vocational Follow-Up System

(1) (3) (5) (7) (11)

PLEASE LEAVE ALL RED SQUARES BLANK

(13) Date Month (15) Year

FOLLOW-UP QUESTIONNAIRE

ALL RESPONSES WHICH YOU GIVE WILL BE KEPT STRICTLY CONFIDENTIAL

GENERAL DIRECTIONS: Please complete ALL sections that apply. When you have completed the form return it in the enclosed return-addressed, stamped envelope. Your frank response is very important in order that the area vocational technical institutes may continue to improve their programs.

CONFIDENTIAL

I. PERSONAL INFORMATION

A. Name _____ (Last) (First) (Middle) B. Soc. Sec No. (17) (25)

C. Present Address _____ (Street or Rural Route)

_____ (City) (State) (zip code)

D. Home Phone _____ (area code) Work Phone _____

II. ADDITIONAL TRAINING

A. Since attending the area vocational-technical institute, what [illegible] educational training have you taken part in? (You may check more than one.)

(26) [1] None

(27) [1] On-the-job training (employer-sponsored training program)

(28) [1] Public area vocational school programs

(29) [1] Private vocational programs

(30) [1] University, college and/or junior college programs

[1] Apprenticeship

(32) [1] Specialized occupational military training

(33) [1] Other _____ (specify)

III. EMPLOYMENT INFORMATION [illegible]sent status

A. Are you presently emp[illegible], in the military, unemployed, or unavailable for employment? (Check *only* one of employed, military, unemp[illegible], or unavailable for employment.)

[1] Employed

(34) [ ]

[2] Military

[3] Unem[illegible]d (You are actively looking for a job but cannot find one.)

[4] Una[illegible] employment (You cannot accept a job for one of the following reasons. Please check appropriate reason.)

(35) [1] Further training or education

[2] Illness

[3] Housewife or pregnancy

[4] Presently not working and not interested in employment

[5] Other _____ (specify)

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IV. JOB INFORMATION: (IF YOU HAVE NOT BEEN EMPLOYED AT ANY TIME SINCE GRADUATION FROM THE AREA VOCATIONAL–TECHNICAL INSTITUTE, SKIP TO SECTION IX, p. 4.)

DIRECTIONS: 1. If you were employed or in the military at any time since graduating from the area vocational-technical institute, *complete the following section of the questionnaire.*

2. Please supply the requested information for each of the following jobs held during the time since graduating from the area vocational-technical institute. (Include names and addresses.)

(1) First Job (first job after leaving vocational school)

Industrial Code ☐☐☐ (36) (38)

Location ☐☐☐☐☐ (39) (43)

O.E. Code ☐☐☐☐☐☐ (44) (49)

Occupational Code ☐☐☐ (50) (52)

☐☐ (53) (54)

Firm Name_____

What kind of business or industry was this?

_____

(For example, Retail supermarket, dairy farm, road construction)

Firm Address_____

City_____

Job Title_____

(For example: TV repairman, cosmetologist, electrician, farm operator)

Job Duties_____

(For example: Types, files, sells cars, operates printing press, cleans buildings)

Immediate Supervisor_____

Check one: (55)

☐ 1 Full-time job

☐ 2 Part-time job

Check one:

☐ Job related to training

☐ Job not related to training

Number of *months* in this job since graduation from vocational school (56)(57) ☐☐

(58) Were you-- (Mark one box)

☐ Employee of private company, business, or individual, for wages, salary, or commissions.

☐ Federal government employee

☐ State government employee

☐ Local government employee *(city, county, etc.)*

☐ Self-employed in own business, professional practice, or farm

(2) Present Job (job you are presently employed in. If same as first job, write SAME.)

Industrial Code ☐☐☐ (59) (61)

Location ☐☐☐☐☐ (62) (66)

O.E. Code ☐☐☐☐☐☐ (67) (72)

Occupational Code ☐☐☐ (73) (75)

☐☐ (76) (77)

Firm Name_____

What kind of business or industry was this?

_____

(For example, Retail supermarket, dairy farm, road construction)

Firm Address_____

City_____

Job Title_____

(For example: TV repairman, cosmetologist, electrician, farm operator)

Job Duties_____

(For example: Types, files, sells cars, operates printing press, cleans buildings)

Immediate Supervisor_____

Check one: (78)

☐ 1 Full-time job

☐ 2 Part-time job

Check one:

☐ Job related to training

☐ Job not related to training

Number of *months* in this job since graduation from vocational school (79) (80) ☐☐ 0 8 (1) (2)

(3) Were you-- (Mark one box)

☐ Employee of private company, business, or individual, for wages, salary, or commissions.

☐ Federal government employee

☐ State government employee

☐ Local government employee *(city, county, etc.)*

☐ Self-employed in own business, professional practice, or farm

(3) How many jobs, including your first and present job, have you had since leaving the area vocational-technical institute? ☐ (4)

V. ADVANCEMENT INFORMATION

A. Have you had a formal advancement in job classification (other than just salary increases) since taking your first job after leaving the area vocational-technical institute?

(5) YES [1] NO [2]

B. NOTE: The following item need not be completed if you prefer not to complete it. Please do not include overtime when calculating your monthly salary. (Check the appropriate squares.)

Salary Range Before Deductions Not Take-Home Pay	Under $250	250-299	300-349	350-399	400-449	450-499	500-549	550-599	600-649	650-699	700+	
First Job Monthly Salary Range												(6-7)
Present Job Monthly Salary Range												(8-9)
	01	02	03	04	05	06	07	08	09	10	11	

VI. JOB SATISFACTION SURVEY: (IF YOU ARE NOT PRESENTLY EMPLOYED, SKIP TO SECTION VII.)

DIRECTIONS: The purpose of this survey is to enable you to express your feelings of satisfaction or dissatisfaction with your present job. Please answer all questions by placing an "X" in the appropriate square.

A. How do you feel about your present job?

(10)

- [1] Like it very much
- [2] Like it somewhat
- [3] Neither like nor dislike it
- [4] Dislike it somewhat
- [5] Dislike it very much

B. Considering the characteristics of your present job, rate the degree to which you are satisfied with each of the following:

	Satisfied	Not Sure	Dissatisfied			Satisfied	Not Sure	Dissatisfied	
1. Salary	[1]	[2]	[3]	(11)	7. Pace (speed) of work	[1]	[2]	[3]	(26)
2. Fringe benefits	[1]	[2]	[3]	(12)	8. Facilities and equipment with which to do the job	[1]	[2]	[3]	(27)
3. Potential for advancement	[1]	[2]	[3]	(13)	9. Working conditions	[1]	[2]	[3]	(28)
4. Supervision and management	[1]	[2]	[3]	(14)	10. Variety of work tasks	[1]	[2]	[3]	(29)
5. Co-workers	[1]	[2]	[3]	(15)	11. Job security	[1]	[2]	[3]	(30)
6. Company policies and practices	[1]	[2]	[3]	(16)	12. Safety conditions	[1]	[2]	[3]	(31)

TRAINING PROGRAM QUESTIONNAIRE: (IF YOU ARE PRESENTLY EMPLOYED OR HAVE BEEN EMPLOYED AT ANY TIME DURING THE YEAR SINCE GRADUATION FROM THE AREA VOCATIONAL-TECHNICAL INSTITUTE, COMPLETE THIS SECTION OF THE QUESTIONNAIRE.)

DIRECTIONS: Please answer all of the following questions concerning the quality of the curriculum and the quality of the facilities and equipment associated with the program from which you graduated. Place an "X" in the appropriate square.

VII. CURRICULUM

A. In light of your experience on the job, how do you feel about the training you received in basic job-related (performance) skills at the area vocational-technical institute?

(32)

- [1] Excellent
- [2] Very good
- [3] Adequate
- [4] Inadequate

B. In light of your experiences on the job, how do you feel about the training you received in job-related general technical knowledge at the area vocational-technical institute?

(33)

- [1] Excellent
- [2] Very good
- [3] Adequate
- [4] Inadequate

VIII. FACILITIES AND EQUIPMENT

A. The equipment at the area vocational-technical institute in my training area was such that:

(34)

- [1] I found it very easy to adapt to the equipment on the job.
- [2] I had some problems adapting to the equipment on the job.
- [3] I found it very difficult to adapt to the equipment on the job.

B. In comparison to the facilities and equipment used on your present job, how would you rate your area vocational-technical institute facilities and equipment?

(35)

- [1] Area vocational-technical institute facilities and equipment were superior to those on the job.
- [2] Area vocational-technical institute facilities and equipment were similar to those on the job.
- [3] Area vocational-technical institute facilities and equipment were inferior to those on the job.

Appendix V
REPLACEMENT RATES FOR SELECTED OCCUPATIONS

REPLACEMENT RATES FOR "OTHER" MAJOR OCCUPATIONAL CATEGORIES

Code	Occupational Group	Annual replacement rate
1141	Other professional technical	.0270
1214	Other managers, officials	.0292
1305	Other sales workers	.0316
1429	Other clerical workers	.0511
1534	Other craft workers	.0233
1630	Other operative workers	.0293
1725	Other service workers	.0293
1810	Other laborers	.0294
1905	Other farmers and farm laborers	.0075